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NUCLEAR AND MISSILE PROLIFERATION

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NUCLEAR AND MISSILE PROLIFERATION

THURSDAY, MAY 18, 1989

U.S. SENATE,
COMMITTEE ON GOVERNMENTAL AFFAIRS,
Washington, DC.

The Committee met, pursuant to notice, at 9:45 a.m., in room SD-342, Dirksen Senate Office Building, Hon. John Glenn, Chairman of the Committee, presiding.

Present: Senators Glenn, Roth, Levin, and Lieberman.

OPENING STATEMENT OF CHAIRMAN GLENN

Chairman GLENN. The hearing will come to order. This is an anniversary of sorts because exactly 15 years ago today on a hot day in a remote, dusty corner of a South Asian desert, the world awoke to the news that India had detonated a nuclear device. Although India declared at the time that this was a so-called PNE, a "peaceful nuclear explosion," a phrase that now seems to come from another age, this event triggered a major international effort to tighten controls over the global spread of the bomb.

The concern was not so much just with India, which to its credit has wisely chosen not to develop a nuclear arsenal, but with the whole new set of uncertainties that were created, and new risks that some day somehow we would all become embroiled in a nuclear holocaust.

That was the way things were when I first entered the Senate, and I have devoted a very substantial amount of my career here to preventing just such a nightmare from occurring, with the Nuclear Nonproliferation Act and other activities through the years.

To identify what new steps are needed to stop the spread of these weapons, we must learn some hard lessons from our past experiences. The last declared nuclear weapon state was China, which exploded its first device in 1964. Since then the lack of any new declarations of nuclear tests in additional countries, good news though it is, should not give us any grounds for complacency. We see Pakistan continuing its pursuit of the bomb, and both India and Pakistan facing off in what may be an arms race that involves both nuclear weapons and ballistic missiles.

Any day now India is expected to test launch its new Agni intermediate range ballistic missile. We see Pakistan having joined South Africa, India and Israel into the club of what we call de facto nuclear weapon states. We see Argentina, Brazil, Israel, Pakistan, India, China and other nations continuing their refusal to join the international community of nations that has signed the Nuclear Nonproliferation Treaty, NPT. We see others who have signed like

Iraq, Iran and Libya showing continued interest in acquiring nuclear weapons and ballistic missiles.

We see a dangerous proliferation of missile technology worldwide despite the previous Administration's efforts to establish an international Missile Technology Control Regime, technology that can be used to deliver nuclear as well as chemical or biological weapons. We see report after report of weaknesses in the nuclear export control systems of our closest friends and allies and have witnessed for years the resistance of these friends and allies to our longstanding concerns about these problems.

Some of these problems now appear to be getting some attention, but it remains to be seen if these reforms will be too little and too late. We see the International Atomic Energy Agency which is charged to "safeguard," and I put safeguard in quotes because it does not safe anything nor does it guard it. It is basically an information gathering system that makes information on what is going on in the nuclear regimes around the world available for international scrutiny. But the IAEA is charged to safeguard peaceful international nuclear commerce. But handicapped by a zero growth budget, despite the near impossible task it faces in the future of keeping track of hundreds of tons of toxic weapon usable plutonium that Japan, France, other nations wish to use and transport as a nuclear fuel.

Fortunately we have here today three spokesmen for a new Administration, an Administration that has publicly committed itself to a very strong national policy against the spread of nuclear weapons and missiles. We will hear from CIA Director William Webster whose recent speeches and testimony on the proliferation of chemical and biological weapons and missiles have helped us all to understand how these weapons threaten our security and create a public awareness. I want to congratulate him for being willing to make public statements in this regard from his vantage point.

And today he will provide additional details about the nuclear proliferation threat. I am sure that the material that he will discuss will underscore that we have a lot of work to do before these "weapons of hell," as A.M. Rosenthal of The New York Times aptly called them, before they are put under effective control.

I appreciate very much Judge Webster's willingness to testify here today. We understand he is not here as an expert on all of the very complex technical details of each program. As he said, if you want to discuss habeas corpus, that is fine. As far as exact details of how nuclear weapons are put together, he is probably not the best expert in the country. But he certainly has experts that do make assessments on these things, and he is here as a spokesman for all of CIA. I am sure his testimony will be very helpful.

And we will hear from Ambassador Ron Lehman, the new Director of the Arms Control and Disarmament Agency, ACDA, who arrives at his post with fresh experience working on proliferation issues as Assistant Secretary of Defense. We are grateful to have him here today for his first public testimony as Director of ACDA.

We are also fortunate to have with us today Ambassador Reginald Bartholomew, the Undersecretary for Security Assistance, Science and Technology, who has responsibility for non-proliferation

policy at the State Department. Ambassador Bartholomew is also making his first appearance before Congress in his new position.

The hearing today will give us the opportunity to hear from the new Administration about the threats we face from nuclear and missile proliferation, the remedies that are being considered to these problems, and the organization of their efforts to find some solutions.

Today's testimony and questions will help us decide about the steps we must take tomorrow as we continue to struggle to achieve our non-proliferation goals. It is no secret that I had major differences with the previous Administration in this area, but I certainly look forward to working with the new Administration to restore non-proliferation to a top national priority.

Senator Roth.

OPENING STATEMENT OF SENATOR ROTH

Senator ROTH. Thank you, Mr. Chairman. First let me say I appreciate your holding these most important hearings today on this matter. And I congratulate you for your continued interest in this most critical problem. President Ronald Reagan did make major progress in the field of arms control. He brought about the withdrawal of a whole class of nuclear missiles from the European Theater. He launched upon strategic arms reduction talks with the ultimate aim of reducing the U.S. and Soviet arsenal of nuclear warheads by 50 percent, and while he did not manage to finalize that agreement, I am quite confident that when it has completed its strategic review, the Bush Administration will follow a similar course. However, our desire to reduce and stabilize the U.S. and Soviet nuclear arsenals should not blind us to the broader nuclear problem now facing the entire world, namely, the proliferation of nuclear weapons and long-distance launch vehicles across the globe.

Our anxiety concerning the proliferation of these deadly weapons must be all the greater because they appear to be spreading into some of the most unstable areas of the world. In many instances, we are witnessing Third World nations developing nuclear weaponry either in response to a perceived threat or pursuit of a military, political objective. Both situations should cause great anxiety to any civilized Nation particularly since in several instances advancement in ballistic missile technology appears to be proceeding hand in hand with progress in nuclear technology.

For several years we have faced the prospect of new unwelcome entries to the nuclear club. Now we must face the fact that these unwanted members may also be members of the missile club, capable of launching nuclear warheads long distances without resort to vulnerable aircraft.

And I view with particular concern allegations that Iraq may be in the process of developing nuclear weaponry. The Middle East is a highly volatile, violent region at the best of times, as Ambassador Bartholomew can amply testify. The process of seeing nuclear weapons tossed into that particular boiling cauldron cannot be countenanced. Nuclear weapons could all too easily be incorporated into a pan-Arab military campaign against the State of Israel or

they could be utilized in an internecine between Iraq and Syria for the leadership of the Arab world.

The United States, the Soviet Union, and their allies need to work cooperatively to prevent the realization of either of these scenarios. Nuclear conflict in the Middle East, be its victims Arab or Israeli, stands in the interest of no one.

I must also note, in passing, that several press reports have alleged that Japanese and West European firms have been involved in the upgrading of Iraqi capabilities in this area. I shall be most interested to hear what steps our witnesses and panelists will suggest might be taken against those engaged in this particularly deadly trade.

Pakistan's apparent determination to develop a nuclear arsenal is no less disturbing, particularly in light of the deep historic enmity between Pakistan and its neighbor India, which has already detonated a nuclear device. Granted, the traditional high degree of tension between these two nations has lessened somewhat in the aftermath of the Soviet withdrawal from Afghanistan and the accession to power of Mrs. Bhutto. However, I do not believe we should be overly sanguine. Animosities with such deep roots cannot be lightly dismissed and I must note, albeit grimly, that India may now have attained the ballistic missile technology which would eventually enable it to launch a nuclear warhead into Pakistan.

As a final example of the escalating danger of nuclear proliferation, I would like to draw the Committee's attention to the situation in South Africa. South Africa's ruling minority is under siege from within, beset by escalating levels of violence in the black townships, black economic boycotts and criticized by a white electorate economically devastated by high inflation and the economic lunacy that is apartheid. I do not have to tell anyone here that a country beset with so many internal problems is often tempted to seek unity in foreign adventures, particularly when the potential victims are as weak as South Africa's neighbors and when the aggressor apparently possesses the ultimate reassurance of a nuclear arsenal.

Mr. Chairman, I do not intend to catalog all of the world's nuclear proliferation woes here today. I would ask that my full statement be included as if read in its entirety, and I look forward to hearing the witnesses and the panel.

Chairman GLENN. Fine. Thank you, Senator Roth. And I would ask unanimous consent to enter statements by Senator Jeff Bingaman and Senator Jim Sasser in the record. Senator Bingaman was unable to be with us today. He had to be in New York this morning. Senator Sasser also had a previous commitment.

[The statements of Senators Roth, Bingaman, and Sasser follow:]

PREPARED STATEMENT OF SENATOR ROTH

Mr. Chairman, President Ronald Reagan made major progress in the field of arms control. He brought about the withdrawal of a whole class of nuclear missiles from the European theater. He then launched upon strategic arms reduction talks, with the ultimate aim of reducing the U.S. and Soviet arsenals of nuclear warheads by 50%. He did not manage to finalize an agreement on the latter subject prior to his departure from the White House. However, I am quite certain that, when it has completed its strategic review, the Bush administration will follow a similar course.

However, our desire to reduce and stabilize the U.S. and Soviet nuclear arsenals should not blind us to the broader nuclear problem now facing the whole world, namely, the proliferation of nuclear weapons and long distance launch vehicles across the globe.

Our anxiety concerning the proliferation of these deadly weapons must be all the greater because they appear to be spreading into some of the most unstable areas of the world. In many instances, we are witnessing third world nations developing nuclear weaponry either in response to a perceived threat or in pursuit of a military/political objective.

Both situations should cause great anxiety to any civilized nation, particularly since, in several instances, advancement in ballistic missile technology appears to be proceeding hand in hand with progress in nuclear technology. For several years we have faced the prospect of new, unwelcome enteries to the nuclear club. Now we must face the fact that these unwanted members may also be members of the missile club, capable of launching nuclear warheads long distances without resort to vulnerable aircraft.

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As a final example of the escalating danger of nuclear proliferation, I would like to draw the committee's attention to the situation in South Africa. South Africa's ruling minority is under siege from within, beset by escalating levels of violence in the black townships, black economic boycotts and criticized by a white electorate economically devastated by high inflation and the economic lunacy that is apartheid. I do not have to tell anyone here that a country beset with so many internal problems is often tempted to seek unity in foreign adventures, particularly when the potential victims are as weak as South Africa's neighbors and when the aggressor apparently possesses the ultimate reassurance of a nuclear arsenal.

I do not intend to catalog all of the world's nuclear proliferation woes here today. I have singled out the examples of the Middle East, India-Pakistan and South Africa simply to demonstrate the devastating import of these non-proliferation questions in some of the most politically unstable parts of the world today. This is not an abstract, academic subject, but one which bears vitally and directly upon the lives of millions of people around the globe.

In the past, the U.S. Government frequently has encountered considerable difficulty both in determining where nuclear and missile non-proliferation concerns fit in the hierarchy of foreign policy priorities and in deciding which branches of the executive should enjoy prime responsibility for implementing the non-proliferation agenda.

On occasions, one has had regrettable impression that, in certain bureaux of the State Department, the fight to forestall the proliferation of nuclear weapons has been forced to take a back seat to attempts to reach certain short range diplomatic objectives, to the point where it has actually been suggested that this country should supply sensitive nuclear materials and technologies to governments which are not signatories of the nuclear non-proliferation treaty. I cannot approve such strange priorities. However, I feel I should point out that I do not intend to impli-

cate either Ambassador Bartholomew or Mr. Lehman in these remarks and I look forward with interest to hearing how they intend to involve the State Department in the administration's non-proliferation agenda.

As I noted, previous administrations have encountered considerable difficult in organizing internal jurisdiction over non-proliferation questions. Chairman Glenn and I have found ourselves enmeshed in disputes over this question between the departments of State and Defense on more than one occasion. Consequently, I shall be interested to hear how the Bush administration intends to organize itself on the non-proliferation issue. I am aware that not all of the requisite executive branch personnel are in place and, consequently, I suspect that precise answers on organizational questions may not always be possible. Nonetheless, I look forward to hearing our witnesses tell us what they can.

OPENING STATEMENT OF SENATOR BINGAMAN

Mr. Chairman, I regret not being able to attend this morning's hearing because I must be in New York with the Vice President to receive an award. I do appreciate your allowing me to put this statement in the record.

Despite the reduction in East West tensions, the world is becoming a more dangerous place. While the developed world has sought to reduce its armories, the developing world now seeks to acquire and to deploy the most malevolent of the West's weapons.

There should no longer be any doubt about whether the security of the United States is threatened by countries other than the East Bloc. The convergence of missiles and chemical and nuclear weapons in the Third World puts the means of massive destruction not only in more hands, but it puts these weapons into the hands that are most likely to use them. Ironically, while the INF Treaty embodied the desire of the West and the East to reduce the danger of missile attack, the missiles most in demand throughout the Third World are exactly those that will be destroyed under the INF Treaty. For too long we have concentrated solely on the Soviet threat, now, it is urgent that we expand our security strategy to encompass the Third World.

We might ask who is responsible for arming the Third World with these weapons of terror. The answer is, the developed world, both the West and the East. And now that the West is beginning to realize the folly of allowing the spread of these weapons, the more advanced developing countries, China, Brazil, Argentina, and North Korea, increasingly are supplying the Third World's demand for ballistic missiles and other advanced weapons.

The Soviets provided Egypt, Iraq, Syria, and Libya with Scud-B missiles. Now, North Korea builds and exports its own version of the Scud-B missile; it may also serve as a conduit for Soviet and Chinese equipment sales. The United States provided the short-range Lance missile to Israel. China sold the Saudis the CSS-II, an intermediate range ballistic missile. Argentina is sharing missile technology with Egypt and Iraq. Brazil has assisted Libya with a weapons program.

We were surprised and dismayed to learn that West German firms built Colonel Quadafi's chemical complex in Libya. But the saga didn't end there. Messerschmitt-Boelkow-Blohm (MBB), a major NATO firm and German's principal munitions company, helped Argentina develop a missile that can strike the Falkland Islands, the territory of another NATO ally, Great Britain. And, now it is alleged by the West German news magazine "Der Spiegel" that this same firm, MBB, may also have supplied missile technology to Iraq, Egypt and, incredibly, Romania.

I am surprised and distressed to learn that certain unscrupulous citizens and companies of a close ally would ignore their own laws and, even their own security interests. If these allegations are true West German firms will not only have violated their own exports laws, they will have placed their government in a most embarrassing position. West Germany is a member of the Missile Technology Control Regime (MTCR) under which Germany, the U.S., and five other allies have agreed that there would be a strong presumption to deny technology transfers used in the design and development of missile systems. Germany, a COCOM member, has an international obligation to strictly control munitions and dual use technology exports to East Bloc countries.

While the West German Government should be commended for its current investigation of these firms, for several years it apparently knowingly allowed them to continue supplying chemical and missile technology to unstable and hostile regimes. According to former Department of Defense Assistant Secretary Richard Perle, in testimony before this committee, the West German Government ignored repeated requests by our State Department to stop these transfers.

West Germany is not alone. Other close allies and members of the Missile Technology Control Regime (MTCR) also have neglected to enforce their international commitments to chemical and missile non-proliferation. A major French company, SAGEM, allegedly supplied Brazil with missile technology. And a subsidiary of FIAT, SNIA-BPD, joined MBB in helping the Argentines build the Condor II missile.

Although a few American firms have been involved in the provision to Middle Eastern countries of chemicals for weapons development, major American munitions firms deserve praise for not being involved in this dirty business. Still, we are not without blame. The issue here at home is not so much the problem of cheating, but liberal interpretation of export laws governing dual use missile technology. For example, the Departemnt of Commerce strongly advocated the export of MTCR controlled technology to India, and it has approved export licenses for technology and equipment used in the construction of the Iraq Saad-16 missile complex.

Our control of sensitive technology and equipment is inadequate. It targets only East/West trade. There is no effective mechanism for controlling the flow to the Third World of dual use technology which can be used to develop missiles. Few export licenses for dual use technology used in the development of missiles are referred to the Departments of Defense and State. Further, there is no system to alert Commerce to which developing countries are most likely to use American technology in the development of ballistic and cruise missiles.

What can be done? On May 2 the Defense Industry and Technology Subcommittee held a hearing on Ballistic and Cruise Missile Proliferation to the Third World. The testimony of government and expert witnesses convinced me that the administration needs to promptly complete its review of this critical issue. But the review should not be an excuse for inaction. The measures listed below are those that the administration should begin carrying out now:

The Department of Commerce must more strictly review MTCR dual use equipment and technology export license requests to countries known to be developing ballistic or cruise missiles and to European firms that are suspected of violating the MTCR;

The Office of Munitions Control at the Department of State should deny to firms suspected of violating the MTCR agreement export licenses for technology that directly contributes to the development of ballistic or cruise missiles;

The Department of State as a matter of urgency should undertake discussions with MTCR members in an effort to seek a common and stricter interpretation of the MTCR agreement; and

The Department of State should seek, as a matter of priority, agreements with the Soviet Union, China, Argentina, and Brazil that would curtail missile transfers to developing countries.

If these measures are undertaken now, there is the possibility that we can commit ourselves to a serious program of ballistic and cruise missile control. None of these measures require legislation. They are not difficult nor are they complicated. They require only that the administration commit itself to reduce the threat of missile proliferation. We cannot safely wait any longer. Today, I challenge the administration to make good on President Bush's pledges to control missile proliferation by carrying out the four measures that I have just outlined.

Opening Statement of Senator Sasser

Mr. Chairman, already in the 101st Congress this committee has held several hearings on the important global security issues such as chemical and biological weapon proliferation. Just last February Judge Webster was sitting here before us testifying on the dangerous proliferation of such ghastly weapons. And let me say, what he said about the spread of chemical and biological weapons in the third world left me feeling very uneasy.

Well, once again Judge Webster is before us, and once again the issue being discussed concerns the spread of potentially devastating weapons. Today's topic concerns the spread of the most destructive weapon duo in the mankind's arsenal, nuclear weapons and long range missiles. For when these two elements are allowed to be put together—as several developing nations are now trying to do, or may have already done—the potential for mass destruction and global turmoil is greatly increased and the world is a much less safer place to live.

It is very disturbing to know that nations such as Libya and Iraq are trying to build nuclear programs that could be used for weapon production with material and technological expertise provided by our allies in Europe. Furthermore, it is equally

disturbing to know that at the same time, nations such as the Soviet Union and China are supplying these radical countries with long-range missiles.

Already we have witnessed in the Iran/Iraq war the willingness of nations to use long-range missiles against population centers in addition to using chemical weapons against civilians. And while such use of these weapons came as a surprise to western nations, who believed such tactics were too barbaric for modern use, both nations committed these atrocities with virtual impugnity. In fact, as Judge Webster mentions in his testimony prepared for today, the greatest effect of the use of missiles in the Iran/Iraq war was to increase the demand for long-range missiles among third world governments.

One question that deeply disturbs me, as it probably does many of us here today, is, what will stop third world nations from using long-range missiles in future conflicts if they possess them. Furthermore, at the present rate of nuclear proliferation what will stop nations such as Iraq, North Korea, Pakistan, and India from using nuclear weapons in the not too distant future during some conflict.

As long as nations such as China stubbornly refuse to join international treaties against the proliferation of nuclear weapons, while at the same time aggressively promoting sales of ballistic missiles and missile technology to unstable regions, it will only be a matter of time before some unstable or radical regime gets its hands on a nuclear weapon.

Unfortunately, all the blame can not be heaped on China or the Soviet Union. There are nations in the west, including the United States, that have permitted or failed to stop the transfer of critical technology and material to unstable and radical nations.

The bottom line is that something has to be done now. Pressure must be applied or sanctions brought against those nations who seek to produce nuclear weapons or indiscriminately sell ballistic missiles. Furthermore, of equal importance is to put an end to the indiscriminate transferring of technology, material and expertise needed for nuclear weapon and ballistic missile production.

It is of paramount importance that the issues surrounding the proliferation nuclear weapons and long-range missiles be dealt with fast and forcefully. The Government, Congress and the international community must explore all options available to stop or prevent the use of these devastating weapons.

However, if some nations resist, America and her allies should not be deterred from taking the lead and make unilateral moves. As the air strike on Libya and the Toshiba boycott have shown, America has the capacity to take effective measures against hostile foreign nations and companies in matters of national security.

The price of failing to stop nuclear weapon and ballistic missile proliferation is high. Therefore, it is imperative that we examine and explore the proliferation of these dangerous weapons. We must work toward viable solutions or suffer potentially serious consequences.

Chairman GLENN. Senator Lieberman.

OPENING STATEMENT OF SENATOR LIEBERMAN

Senator LIEBERMAN. Thank you, Mr. Chairman. Thank you again for your leadership in this critical area and for convening these hearings this morning. If I may say briefly, there is a painful irony to the fact that as negotiations continue between the great superpowers to ease tensions, in fact, the world may be becoming a more dangerous place. While we in the West and the Soviets are seeking to reduce our weapons inventories, Third World countries are attempting to obtain nuclear materials and ballistic missile technology from the industrial world.

The very missiles, for example, that will be destroyed under the INF Treaty are among those that are most in demand in the developing nations. Slowing the proliferation of ballistic missiles and nuclear weapons exports will require diplomatic progress on several fronts. It seems to me that we must begin by reaching an understanding with our allies about the need to strengthen the Missile Technology Control Regime, the so-called MTCR, that Mr. Chair-

man, you have referred to. And that is the group founded to stem the proliferation of ballistic missiles.

Some allies apparently believe that export controls apply only to countries with nuclear warheads. If this were the case, then the Chinese missiles sold to the Saudis would have been exempted from the MTCR export controls. Clearly, export controls should apply to all countries. We particularly need the cooperation of the Soviet Union and China. Fortunately, the Soviets have recently shown some signs of interest and greater technology controls. Let us hope that the Soviet's new initiatives will extend to this area. As for China, we have to make clear that it should be more vigilant.

And we must do all we can to convince those emerging industrial powers of the world to join our efforts. Countries such as Argentina and Brazil are under great pressure to increase exports because of their international debt. We must be responsive to those debt problems while also making clear that technology controls are one of our highest national priorities.

The Third World is undergoing continuing revolutionary, political, social, and economic changes. We in the industrial world have an opportunity to play a positive role in that process. We should export the best that we have to offer—commercial technologies, business expertise, food, and ideals. But we must restrict those military technologies that threaten to turn the Third World into a battleground instead of a slowly emerging area of hope and democracy. There is obviously no way to know how successful we will be in this effort, but what is clear is that we must make the effort and that we have everything to gain from it in both national and world security.

Mr. Chairman, I look forward to hearing this outstanding group of witnesses that has come before the Committee today, beginning, of course, with Judge Webster. And I thank you very much.

Chairman GLENN. Thank you very much, Senator Lieberman. Judge, we are ready for your statement. Thank you very much for being with us today.

TESTIMONY OF WILLIAM WEBSTER, DIRECTOR, CENTRAL INTELLIGENCE AGENCY

Judge WEBSTER. Thank you, Mr. Chairman. I welcome this opportunity to discuss publicly issues that consume a substantial portion of the time and resources of the intelligence community, the proliferation of nuclear weapons and missiles to deliver them. We cannot now tell you when or where these weapons may be used. We can say that the odds on use are growing as more countries develop the technologies to settle old scores by new means.

Mr. Chairman, your long and distinguished record of leadership on nuclear issues has helped keep that critical issue near the top of our national security agenda. Senator Roth's 8 years of service on the Senate Select Committee on Intelligence have given him insights in the unique intelligence challenges associated with the issues that we consider today. Mr. Chairman, the intelligence community can develop critical information about the spread of nuclear weapons and missiles and the intentions of countries with these weapons. The wisdom required to formulate policies to deal with

the dangers of proliferation is shared by the Executive and the Legislative branches of our Government.

I want to begin by thanking the Committee for understanding my need to be circumspect in my testimony this morning in order to protect some of our more sensitive sources and methods. I will not be able to share detailed intelligence information at this forum. However, we can have a meaningful discussion about many of the fundamental issues and elements of the issues. I will leave the policy implications of the intelligence we provide to my Executive Branch colleagues who will also testify today, and to you and your colleagues in the Congress.

The Central Intelligence Agency has been collecting and analyzing intelligence on the proliferation of nuclear weapons for decades. We employ some of our most sophisticated collection methods and analytical techniques to address this critical issue. Generally, we focus on determining the status of nuclear development in all countries, on acquisition of nuclear materials by countries suspected of developing nuclear weapons programs, and any general procurement that would support nuclear programs in countries that do not now possess nuclear weapons.

We could use our full range of intelligence collection capabilities and strategies to provide policymakers timely finished intelligence about nuclear developments. Our collection and analysis begins with the premise that given a reasonably sophisticated nuclear energy and research program, any Nation requires many years to develop a nuclear weapons capability.

As a Nation begins to develop nuclear weapons, we have found that technical and political tipoffs provide key indicators for intelligence analysts. Our analysts not only examine technical capabilities and programs, they also consider whether the activities really make sense for a purely civilian nuclear program. For example, we would be concerned if a Nation began developing a difficult and expensive uranium enrichment capability, not required by existing nuclear power reactors.

While our intelligence successes in this field cannot be discussed publicly, we have helped slow down the spread of nuclear weapons through timely intelligence that has enabled our policymakers to take appropriate action to discourage weapons development. Future success will be harder to come by. Today we are finding that tracking both nuclear development and procurement is more complicated.

For example, we are beginning to see procurement of unrelated technologies for nuclear missile and CBW programs through common purchasing agents. These agents are often associated with either an amorphous science and technology organization or with a large industrial user. Consequently, identifying the real purpose for which a suspect item was procured is now more difficult.

Our collection and analytical problems are, of course, compounded by sales of items that could be used either for purely legitimate industrial purposes or for the production of nuclear weapons. These so-called dual-use technologies require us to track an item to its final destination. We often accomplish our mission but the effort is extremely costly in terms of our time and very scarce resources. The key to a nuclear weapons program is acquiring plutonium 239

or highly enriched uranium. Sensitive and highly specialized technologies are required to obtain enough of these materials for even the simplest nuclear weapon.

The ability to acquire and master these technologies determines how quickly a Nation can develop and produce nuclear weapons. While plutonium is important, potential proliferators are dependent on a broad range of aid from states with nuclear weapons. Even some of the more advanced countries need more than hardware. They need technical expertise from chief scientists down to the technicians who run the plant. Furthermore, after they acquire the knowledge and equipment required for nuclear weapons development, we find that they have continuing need for spare parts and expert maintenance. From an intelligence perspective, foreign assistance is a wild card in assessing progress toward nuclear weapon development.

It helps Third World nuclear programs leapfrog technical obstacles that might take years or perhaps a decade to overcome with their own limited resources. Since the early 1960's, we have found foreign suppliers providing the following types of assistance for the possible development of nuclear weapons: complete nuclear facilities; technical and operations expertise; significant equipment and material; ancillary equipment and material; and training for personnel. As this Committee well knows, sensitive nuclear technologies are subject to U.S. and international expert controls. However, we have found that nuclear technology is acquired illicitly and clandestinely through front companies, false export documents, and multiple transshipment points.

We are finding that regulations are being circumvented by ordering equipment or material in quantities that fall just below the export control guidelines but which in the aggregate would be subject to controls. Many commercial suppliers know exactly what their products will be used for.

Others suspect but perhaps care more about the dollar, or mark, yen or franc than about the consequences of nuclear proliferation. We all become discouraged at times about the continuing spread of nuclear weapons despite the Non-Proliferation Treaty, the efforts of the International Atomic Energy and various laws designed to check nuclear proliferation.

But I want to reflect for a minute on the value of the various nuclear control regimes from an intelligence perspective. As an intelligence organization, we must be concerned about the development of nuclear weapons in any country or by any sub-national group. If a country refuses to join a nuclear control regime, we have a clear signal that we should focus additional attention on its nuclear development programs, and we certainly do.

From my perspective, the Non-Proliferation Treaty and the activities of the International Atomic Energy Agency help us use our intelligence resources more effectively to track nuclear developments. We have also seen the deadly consequences of missile proliferation. Ballistic missiles armed with conventional warheads were used against civilians when Iran and Iraq launched scores of missiles during the War of the Cities. Iraq's ability to hit Tehran caused a sizable portion of the population to flee. We have found that the use of missiles in War of the Cities has had an impact

beyond Iran and Iraq. The demand for ballistic missiles has increased among Third World governments.

Because the ability to develop a nuclear or other weapon of mass destruction to a distant target affects both regional and global stability, ballistic missile programs are as important a target of intelligence collection and analysis as the weapons they carry.

To some extent, data concerning the status of missile development programs is less difficult to track than nuclear weapons development. New missile systems must be tested thoroughly and in the open while much of the work involved in the development of nuclear weapons is more easily concealed in the labs.

However, the intelligence challenge associated with discovering the initial intent to develop a missile and to acquire the expertise and material to do so is about the same as for nuclear weapons. Ballistic missiles enter Third World arsenals most quickly through the purchase of operational missile systems. The Soviet Union has been a traditional supplier of short-range ballistic missiles. It has sold Scud-B missiles widely in the Middle East.

Ironically, the Soviets may soon be competing with an old client, North Korea, which now manufactures its own copy of Scud. China has emerged as a willing supplier as evidenced by its sale of the CSS-2 intermediate range ballistic missile to Saudi Arabia. China is actively promoting the export of shorter range ballistic missiles. A mix of financial and political objectives appear to motivate these sales.

In the long term many countries will not want to rely on foreign nations for their arsenal of strategic missiles. By the year 2000 at least 15 developing countries will be producing their own ballistic missiles. Although many missiles being developed by these countries are not as accurate as U.S. or Soviet weapons, they are cause for great concern. The Scud missiles Iran and Iraq used in the War of the Cities were first produced in the Soviet Union in the 1950's. Nevertheless they hit their targets in Iran and Iraq. Even 1950's technology can become a truly strategic weapon in a region of conflict such as the Middle East.

Like nuclear weapons programs, Third World missile programs rely on foreign technology to some degree. No country that we know of in the Third World has been able to develop a ballistic missile without some foreign assistance and none is likely to be able to do so for the foreseeable future.

A number of firms in Western Europe have well established record of supplying equipment and technical assistance to Third World ballistic missile programs. This aid has included transfer of critical missile components and the direct participation by European missile specialists in missile development programs.

As with nuclear programs, countries will often claim falsely that a technology they are seeking for a missile program will be used for an entirely benign and plausible purpose. Cover firms which are frequently little more than a post office box number are established where export controls are more lenient.

Recently, we have begun to find that once a Nation establishes a procurement network in one field, missiles, for example, that network is used as a conduit for procurement in other fields such as nuclear or chemical weapons. We anticipate finding more of an

overlap in procurement networks and strategies in many Third World missile, nuclear, and chemical/biological warfare programs in the years ahead.

We in the intelligence community fully understand that much of the technology critical to ballistic missile development was passed from the developed to the developing world long ago. Now we find Third World countries sharing technology, pooling their resources and technical know-how in areas such as solid rocket fuel production. Countries that a few years ago were wholly dependent on foreign suppliers for their own missile programs are now retransferring technology to new Third World missile development efforts.

Not all critical technology has passed from our control. Technology control efforts and the intelligence collection and analysis to support them remain important. Third World countries often seek new, state-of-the-art Western technology and expertise to overcome critical hurdles in their missile programs.

For example, most Third World nations lack the expertise to build missile guidance systems. Cutting off the supply of guidance technology can cripple a Third World missile program. Even with the most effective control regimes and with the best intentions, a country can become an unwitting partner to a ballistic missile program, particularly through dual use technology. For example, in the mid-1960's, the United States accepted a young Indian scientist into a training program at the Wallops Island Rocketry Center. This scientist returned to India, and with the knowledge he gained from his work on civilian space programs, Dr. Kalam became the chief designer of India's Prithvi and Agni ballistic missiles.

Unfortunately, most technologies applicable to a space launch program can be used in ballistic missile development. Several countries have space and missile programs which overlap. Space programs have been used as a conduit for materials and equipment designed for a ballistic missile development effort. Moreover, as both the United States and Soviet Union have demonstrated, space launch vehicles themselves can be converted into ballistic missiles. The intelligence community is using its resources to support the objectives of the Missile Technology Control Regime. We understand the objectives of the seven nations that signed the Regime, but note that many of the key countries involved in missile and advanced technology sales are not party to it. This was highlighted by China's sale of the CSS-2 to Saudi Arabia.

Even for its own members, the Missile Technology Control Regime is a voluntary, non-binding agreement that imposes no sanctions on violators. The agreement is only as effective as each member wishes it to be. For the intelligence community, the voluntary nature of the regime means that we have to be particularly alert for violations. As always, we face the problem of protecting our sources of intelligence when policymakers take action based on information about violations.

We are following missile programs in South Asia and in the Middle East very closely. We are particularly concerned about the growing missile race between India and Pakistan. Both countries have within the past 15 months announced successful test launches of indigenously developed short-range ballistic missiles. India has also announced it is preparing to launch an indigenously produced

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medium range ballistic missile. The regional impact of ballistic missile proliferation is graphically illustrated in the Middle East.

Iraq appears to have doubled the range of its Soviet supplied Scuds by reducing the amount of high explosives in the warhead. That technique brings Tehran and Tel Aviv within striking range. Iran recently claims to have produced its own ballistic missile with a range of 200 kilometers. The pace of ballistic missile development in both countries likely will accelerate as they are able to redirect resources formerly devoted to their respective war efforts.

Iraq hopes to acquire and eventually produce the Condor II short-range ballistic missile currently under development in Argentina. Libya, Egypt and Syria have received Scud missiles from the Soviet Union. Tripoli fired two missiles against U.S. forces on Italy's Lampedusa Island after the U.S. airstrike in 1986.

Israel placed a small satellite into orbit last September. That launch suggests that Israel has the capability to produce medium or intermediate range ballistic missiles. Third World countries can now deliver nuclear, chemical, or biological warheads by artillery or aircraft more precisely and more cheaply than with current ballistic missiles.

But we judge that ballistic missiles will be the preferred delivery system of many nations because they cannot be defended against as effectively as artillery or aircraft. For that reason, that deterrent value of ballistic missiles is higher. Furthermore, they are more prestigious than conventional systems.

We believe the missile proliferation problem will affect every region in the world. It will become worse and may never become better. The intelligence community will continue to provide intelligence support to policymakers' efforts to implement missile proliferation control regimes. Efforts to implement missile proliferation control regimes will continue. We will also devote the resources required to understand the world in which ballistic missiles loaded with nuclear or chemical or biological warheads are a major factor of the conflicts in each region of the world.

Because the ability to develop a nuclear or other weapon of mass destruction to a distant target affects both regional and global stability, the spread of ballistic missiles has been as important a target of intelligence collection and analysis as the weapons that they carry.

Mr. Chairman, your hearings today provide us with a timely opportunity to review one of the most dangerous conditions that our world faces today. Nuclear proliferation combined with the spread of chemical and biological weapons and the missiles to deliver weapons of mass destruction have the potential to place many regional conflicts on the brink of catastrophe. I can assure you that we in the intelligence community will use all the means at our disposal to provide policymakers with the information that they need to confront the problem.

Mr. Chairman, that concludes my formal statement. I would be very pleased to respond to questions at this time.

Chairman GLENN. Thank you very much, Judge Webster. That is an excellent summary of where we stand these days, and it is obviously a rather grim one. You know, back when we were working on NPT and the Nuclear Nonproliferation Act, we felt we had at that

time, back in the mid-1970's, maybe some 12 to 15 years to get some agreement with the Soviets and try and work down the nuclear stockpiles while trying to encourage other nations not to go the nuclear route.

We were reasonably successful in that I think the current count is we have something like 137 nations that have signed NPT, but as you indicated, it is voluntary. Some of those nations get a little restive, and we have another one of the 5-year reviews coming up. I believe it is next year. So we are trying to keep everybody in line while we get some of the other negotiations going, but it is, as you point out, with some 15 countries with ballistic missiles and so on, it is a tough one.

You mentioned that Iraq may be trying to get the Condor-II ballistic missile from Argentina, and that would lead me to my first question along a nuclear line. Is Argentina selling or planning to sell nuclear technology in the Middle East or elsewhere?

Judge WEBSTER. Well, Mr. Chairman, the Argentine Government does have a significant nuclear export agreement with Algeria, and it is currently discussing nuclear deals with Egypt, Iran and Saudi Arabia. Last year Egypt and Argentina signed a 15-year nuclear cooperation agreement, which includes a research reactor, research program, research for waste disposal and radioisotopes production. It has also agreed to supply 20 percent enriched uranium to refuel Iran's Tehran nuclear research reactor. So I think the answer is yes.

Chairman GLENN. Do you then see Argentina emerging as a significant supplier of nuclear technology or equipment?

Judge WEBSTER. I do. There are several reasons why it would seek to do so. And I suppose that our principal intelligence concern is that they are not being produced under international safeguards. And that produces some considerable environmental hazards as well.

Chairman GLENN. What are the key developments in Argentina's nuclear program you would regard as most significant from a proliferation standpoint?

Judge WEBSTER. Well, I think that is just it, Mr. Chairman. They are not under international safeguards, including uranium enrichment, spent fuel processing, heavy water production efforts. Argentina has refused to sign a nuclear non-proliferation treaty, and we are also frankly concerned about Argentina's efforts to be a nuclear supplier to the Third World. We are seeing these transcontinental arrangements between under-developed countries.

Chairman GLENN. We have seen competition back and forth in the past in this field between Argentina and Brazil. What are the key developments in the nuclear program of Brazil that are most significant from a proliferation standpoint?

Judge WEBSTER. Well, I think I ought to leave that question primarily to the policymakers, but I can tell you that we have noted that Brazil continues to construct and operate unsafeguarded nuclear facilities. We have noted that the centrifuge uranium enrichment facility that is being constructed about 90 kilometers west of Sao Paulo is a matter of potential concern. The Brazilian officials have stated that this plant will produce uranium enriched to less

than 20 percent for use in nuclear submarines, research reactors and power reactors.

Chairman GLENN. How advanced is that submarine effort, Brazil's nuclear submarine effort?

Judge WEBSTER. I would not say that it is far advanced, and I think it will probably take them into the next century to come up with something, but it is just another indication of a move into an area that has been highly restricted in the past, and by people willing to accept controls.

Chairman GLENN. Brazil has been willing in the past to talk to or to cooperate at least to some extent with many nations around the world. Can you tell us what the status is between Brazil and Iraq and what they are cooperating on in the nuclear arena?

Judge WEBSTER. Well, they signed an agreement in Baghdad about 10 years ago for cooperation in the field of the peaceful use of nuclear energy. The major areas of cooperation identified are studies of uranium, supply of natural uranium and low enriched uranium for use in nuclear reactors, supply of equipment and construction services for nuclear reactors, security for nuclear reactors, exchange of visits to research and development facilities, and training of human resources. That is going to expire in October of this year, and it can either be renewed for a one year period or either party can terminate it.

Chairman GLENN. We have been concerned, as I have indicated, what triggered off some of the interest in this whole field was India's explosion back in 1974. What is the status of India's uranium enrichment effort now?

Judge WEBSTER. Well, they can produce weapons grade plutonium. Their first such plutonium production capability was a research reactor built near Bombay with the assistance of Canada. There were assurances given that any plutonium produced would not be used for nuclear weapons, but it was used for the nuclear explosive device that was detonated 15 years ago today.

India has since constructed and is now operating a large nuclear research reactor that also has significant plutonium production potential. It is 2½ times larger than the reactor used for its 1974 test, and this new reactor is not subject to international nuclear safeguards.

Chairman GLENN. This next question gets a little technical, I guess, but according to the West German Government, India has received both beryllium metal and beryllium nitrate through the West German firm Degussa. Both shipments had received the approval of the West German Economics Ministry, the Foreign Ministry, the Research Ministry. According to West German officials, India has promised to use the imported quantities for civilian and not for military purposes. But the material went to the Bhabha Atomic Research Center north of Bombay, which is their principal nuclear research center.

Now beryllium can be used in the production of nuclear weapons. It can also be used in the manufacture of x-ray windows, and the United States required a license for shipping the material to the Federal Republic of Germany. The West German Federal Economic Office which authorized the export did so without requesting the necessary reexport license from the United States where the

beryllium originated. I know you follow those things at the agency, and those are some technical questions here. Are you prepared to give us any more information on that? Is that information correct?

Judge WEBSTER. I think that information is substantially correct, Mr. Chairman. As you noted, I am not an expert on some of the highly technical areas here, but we look for indicators and beryllium is usually used to enhance the fission reaction. There are other indicators that tell us that India is interested in thermonuclear weapons capability.

Chairman GLENN. What is the principal concern about Israel's current nuclear program?

Judge WEBSTER. Well, I suppose that there are many ways to put it, but one of the areas that I think is of concern to the policymakers and certainly to all of us who are watching this is the rivalry between India and Pakistan which has all the earmarks of a race, and yet there have been no real efforts made in the international community to try to head off that race based on insecurity on both sides of the border. And I think for those two countries to be dedicating so much of their resources in this area is a cause for international concern about stability in the region.

Chairman GLENN. Another one on India: according to India's Department of Atomic Energy 1986–87 Annual Report, the Bhabha Atomic Research Center had conducted studies on the extraction and refining of thorium and lithium separation of stable isotopes. Now the Annual Report for 1987–88 stated the Center was continuing studies on the recovery and purification of uranium, lithium and helium gas. Studying how to obtain purified lithium has many peaceful applications but studying how to separate lithium isotopes suggests an interest in thermo-nuclear fuels. Lithium 6 can be used for thermo-nuclear devices. Now is that information basically correct, or is that one you would just as soon take for——

Judge WEBSTER. No, that is basically correct, Mr. Chairman, and it is just another indicator of interest leading toward capability.

Chairman GLENN. Where is Iraq getting foreign assistance in its nuclear program?

Judge WEBSTER. Well, prior to the war, the Iran-Iraq War, it was getting its help from Italy and France and the Soviet Union in building its facilities at its Tuwaitha Nuclear Research Center. Last month there was a report of cooperation with Egypt but it was officially denied. I am not prepared to comment on this in this forum.

Chairman GLENN. One more. In 1974 two Israeli scientists applied for and were granted patents in France and West Germany for a method to produce enriched uranium by using laser beams. According to an Israeli newspaper account, the method was developed by two scientists from Tel Aviv University and the Defense Ministry. An Israeli scientist was quoted as saying an Israeli scientist had been seeking a method of purifying uranium for use in reactors for peaceful purposes. In 1981 the Israelis were conducting laser isotope separation research at Ben-Gurion University. Is Israel today carrying out R&D on uranium enrichment? What can you tell us about that?

Judge WEBSTER. It is carrying out research. It is at a very low level of funding. The Israelis did not expect a significant increase

in laser isotope enrichment funding unless the Government decided to build nuclear power reactors. So I suppose that that would be another indicator we would be watching closely.

Chairman GLENN. If there is any additional information on that you could supply, we would appreciate that also.

Judge WEBSTER. Yes, I will, Mr. Chairman.

Chairman GLENN. My time on the first round is up. Senator Roth.

Senator ROTH. Thank you, Mr. Chairman. Mr. Webster, in your opening testimony, you make reference to the fact that there is a voluntary Missile Technology Control Regime that has been signed by, I think, seven countries, six NATO countries and Japan.

You also mention in your testimony that there are a number of firms in Western Europe that have a well established record of supplying equipment and technical assistance to Third World ballistic missile programs. Are any of these well established firms in the countries that have signed these agreements, and are those companies identified publicly or is that classified information?

Judge WEBSTER. It is a little of both. I think, Senator Roth, the best way for me to handle that would be to offer to provide the details in answer to your question in a private briefing or closed session or for the record under appropriate classification.

Senator ROTH. Could you answer this question, and I do not want you to answer anything that you feel is not in the interest of your agency, but are any of these well known firms located or primarily based in countries that have signed this agreement?

Judge WEBSTER. Yes, I can answer that much. There are companies within countries that are signatory to the agreement.

Senator ROTH. Are we aware of whether or not any effort is being made to prevent such sales so that they are in good faith compliance with this agreement?

Judge WEBSTER. It is a very valid question. I am trying to figure out how I can answer that properly in this kind of a session. Perhaps the other witnesses on the policy side can give you some indication of what they have been told about it. Certainly we have seen some examples recently, not in the nuclear area but in the chemical and biological area, where both revisions in local laws and moral suasion through publicity have turned some of those companies down in their effort to provide that kind of assistance. Turn them down, I mean slowed them down.

Senator ROTH. Well, it seems to me that if this agreement is to mean anything then it certainly is appropriate for those countries to take the kind of action that would prevent the disclosure of this technology. Otherwise, it seems to me we have entered into agreement that not only has no teeth, but no effect.

Judge WEBSTER. I agree with you completely, Senator.

Senator ROTH. Would it be helpful, in your judgment, if these companies became known publicly as at least one measure to help put some restraints on their activities?

Judge WEBSTER. I can see no real downside to that. I think there is a policy question of who should do the publicizing, but I can see no downside to pointing out what companies are doing contrary to the policy of their own country.

Senator ROTH. Has any effort been made to your knowledge, under this agreement to establish any kind of guidelines, be they voluntary or compulsory. How could they be enforced, how could it be insured that compliance would be met?

Judge WEBSTER. I do not know the answer to that question, Senator.

Senator ROTH. Let me ask you a question about your own agency. Have you adequate funds in your judgment to follow the proliferation of this technology or are you undermanned?

Judge WEBSTER. I think in general the Congress have been very generous with us in this area, particularly in the nuclear side. We are going to come on more difficult times. I mentioned in my opening statement some of the complexities now in procurement of this type of technology in Third World countries.

Some of the types of weaponry are more difficult to detect than others. That is I have given previous testimony on how difficult it is to identify chemical and biological weapons production facilities because they are so similar to legitimate facilities such as pharmaceutical or fertilizer plants. As those weapons come in to greater demand, we are going to have more pressure on ourselves to be able to identify, locate and identify those facilities.

It comes down in the end to what level of our confidence is sufficient for you and the policymakers to take action, and whether we can give you, we can only tell you the level of our confidence. And I cannot really complain about the resources for this particular effort.

Senator ROTH. Very good. Let me go back to your testimony. As I recall, you mentioned one Indian student who attended one of our institutions and acquired technology that was useful in India's program to move ahead on nuclear matters. Is that an isolated instance or are there many instances where those who come here to study or are on any kind of exchange have been a source of high tech that has helped their native countries to proceed, and if so, is it of such serious moment that this ought to be something we try to address legislatively?

Judge WEBSTER. I am not in a position to say whether it should be addressed legislatively, but it is certainly a problem which has to be carefully monitored. In the scientific community there is a great built in pressure to share, particularly at international levels, and much of the technology that goes into proliferation of nuclear and chemical and biological weaponry has a dual use that is completely legitimate and advances quality of life around the world if properly used.

So I think the challenge is to devise ways to detect when that technology could be converted to illegitimate purposes and knowing when it has been converted for that purpose, and on the first side when you know that it could be converted, deciding whether or not you want to let it out at all, or under what circumstances.

Senator ROTH. Well, my time is up, but I would like to ask you one last question in this same area. Are you aware as to whether there are any guidelines or requirements guiding the universities and other institutions as to whether or not foreigners should be permitted to study there or become involved in their activities or is

this left up pretty much to the discretion of the individual institution?

Judge WEBSTER. I believe that there are very few guidelines of this nature in existence. Some of the other witnesses may have more knowledge of this. If you are talking about fresh research being conducted on the campuses, I doubt that there are very many, if any, limitations on it. It is only when we identify the potential of that research that the governmental interest comes to bear, and I am not entirely conversant with how that is conveyed to the scientists on campus. But I doubt that there is very much local university control over that.

Senator ROTH. Well, certainly we do not want to do anything to inhibit the access of foreign students to our institutions. At the same time, it does seem to me that there ought be some kind of guidance by the Federal Government as to what should be done in cases where technology could be utilized in the proliferation. So I appreciate very much your response, Mr. Webster.

Chairman GLENN. Thank you very much. Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman. Judge Webster, I regret that I had to step out for a moment to attend another hearing during your opening statement, but I have had the opportunity to read your statement and I thank you for it. I just want to say for the record how important it is that you, as Director of the Central Intelligence Agency, are coming forward in a public forum to talk about these issues, I think it contributes immeasurably to the formation of policy by Congress, not to mention the Executive Branch, and in that sense contributes to our efforts to achieve a more peaceful world, and I appreciate very much what you are doing.

If I may begin with a very general question just to set the context. Which countries do you believe at this time are developing nuclear explosive capabilities?

Judge WEBSTER. Having just complimented me for coming out in the open, you ask a question that I am not prepared to answer in an open forum, but I will be happy to supply information either in proper classification for the record or in a private session on this one.

Senator LIEBERMAN. That is fine. Nobody is perfect. Thank you. Let me ask you this question. What is the possibility that terrorists may develop or acquire nuclear weapons from proliferating nations?

Judge WEBSTER. This has been a matter of great concern to all of us for at least a decade. We followed it very directly when I was Director of the FBI, and we are very much concerned that this type of terrorist threat would introduce an entirely different dimension, whole cities being held hostage. I do not think we are there yet, but I can see a degrading of control as these capabilities pass out of the hands of the 5 or 6 major powers who developed them into other countries who then develop the capability and then sell that technology as it taking place at the present time, may ultimately find its way into the hands of people who do not care and who will make that technology available to terrorist groups who engage in activities that they support through state sponsored terrorism.

I must say, however, that I am really less concerned about the immediacy of that problem than I am about terrorists getting con-

trol over other forms of weaponry including chemical and biological weaponry because it requires less technology. They do not have to be as good at producing it. It generally is the kind of material that can be transported with less risk of detection, and besides that, they have a whole range of stockpiles of rockets and other types of conventional weapons that are at their disposal and do about as much damage as they want to see done.

But we cannot discount this ultimate threat, and I think that the intelligence through counter-terrorist intelligence collection must be very, very alert to the possibility that nuclear technology can fall into the hands of terrorists. We have—I know it is no secret—for some time we have had battlefield nuclear weapons that can be carried on the backs of soldiers. So that type of weapon would be very attractive to a terrorist provided they could get their hands on a completed weapon and it is my own view that with so much technical information on nuclear devices being available in our public libraries that probably the key to controlling and reducing the risk lies in controlling the fuel itself, the plutonium and the enriched uranium.

Senator LIEBERMAN. Judge Webster, do you believe from the information you have that the Soviet Union shares our concern about the proliferation of nuclear weapons?

Judge WEBSTER. We are beginning to hear those noises, and they are very welcome expressions of concern. We have been cooperating with them for several years at various international fora, the International Atomic Energy Agency. It does as a supplier require certain safeguards on its specific exports. I think that more recently it is difficult for me to separate nuclear and emerging biological and chemical warfare capability. These are all the kind of threats that I think major superpowers such as the Soviet Union and the United States have to pay attention to. Proliferation is a major problem. It gets out of control. The people that can suffer the most from that can be the super powers.

Senator LIEBERMAN. Let me turn now for a moment to the West. Have we shared information with our allies about the involvement of companies in nuclear proliferation?

Judge WEBSTER. Yes, we have, and we will plan to continue that dialogue.

Senator LIEBERMAN. In your best judgment, how many countries do you think are likely to possess nuclear powered submarines in the next decade, let us say?

Judge WEBSTER. Well, as you know, Senator, there are five countries which currently build nuclear powered submarines: the United States, the Soviets, Great Britain, France and China. And I think there is no plan that we have detected from any of those countries to veer away from continuing to build and operate nuclear powered submarines.

India has one leased submarine which it acquired in 1988. It might be moving toward gathering a few more nuclear powered submarines in the next few years. To the extent that it does so, I suppose there will be pressure on China and other suppliers of weaponry to provide neighboring countries with offsetting capability. The Brazilian Navy Minister has stated that Brazil is not build-

ing nuclear submarines at this time, but he thought that kind of information was vital to the development of any country.

He said that he does not expect Brazil to have indigenously built nuclear submarines in this decade but hopes maybe to begin construction on them at the beginning of the next century. We are not hearing very much in Argentina. They lack, in all probability, the economic resources to even consider working on a project as expensive as an indigenously produced nuclear powered submarine within the next 10 years.

Senator LIEBERMAN. Judge, the Middle East is clearly one of the most unstable regions in the world and Libya one of the most unpredictable and unstable countries in that region and in the world. Do you believe that the Libyans now have or will soon have the capability to, for instance, attack Israel by air?

Judge WEBSTER. Yes, I do. It possesses the capability to attack Israel by air although there are limitations to it. I think I should defer to the Chairman on matters of this kind, but it is my understanding that range of these long-range bombers depends a lot on their trajectory. And if they go up high enough, they have to go up high in order to expand their range. When they do that, they increase the risk of air interdiction either from the ground or from the air, and so some would argue that they lack the low flying capability to attack Israel. But in a pure sense, they can reach it. Whether they get shot down in the process is a matter of military technology that I am not competent to testify on and some of these would require air fueling in order to assure a safe round trip. But it is a threat and it should not be considered anything else but a threat.

Senator LIEBERMAN. One final question. Returning to the Soviet Union, do you have reason to believe that any other Eastern European nations are seeking to develop their own nuclear weapons capability?

Judge WEBSTER. Well, Romania claims that it could but does not want to. I think I should not comment further on that.

Senator LIEBERMAN. Okay. Thank you. My time is up.

Chairman GLENN. Thank you very much. I wanted to go back a little bit and ask some questions that I was not able to ask before. I asked about the research in Israel and their development of uranium enrichment. I would like to follow that on with another question about krytrons. Krytrons are small, very fast acting electrical switches capable of switching very large currents at high voltages with very good timing, and they are a key element in nuclear weapons. They fire the detonators in the high explosive system of a nuclear weapon, and they can also be used, though, for other purposes, for lasers and other missile development. But according to U.S. news accounts published in 1985 Israel admitted obtaining a number of krytrons over the period 1979–83. The Israeli Defense Ministry claimed the devices were used only in conventional research development and testing equipment.

Nevertheless, Federal prosecutors in Los Angeles indicted a U.S. citizen for illegally exporting 810 krytrons to Israel between 1980–83. Israel later returned some of these unused krytrons, but what can you tell us about Israel's use of krytrons? Did they acquire

those? Do you think they are using them in their nuclear program or what is the status on that?

Judge WEBSTER. Well, they have attempted to acquire them. I believe that they have successfully acquired some. They have returned others that were illegally sold into Israel. I have to be a little more careful about this one because while krytrons, which is sort of a small, fast-acting electrical switch, is one of the key devices in firing the detonators in a nuclear weapons high explosive system, it does have other uses, and I do not think we can draw any firm inferences from the situations you have described. But it is the kind of thing that we have to watch very closely, and it often leads us to judgments about intentions and capabilities.

Chairman GLENN. We followed krytrons in Pakistan's efforts some years ago, and they claimed they were going to use them for strobe lights for runways, and by our calculations, I think they had enough for roughly 400 airports or something like that they were going to build with the use of their krytrons. Will Pakistan be able to acquire a nuclear power plant through foreign sources such as Soviet Union or China?

Judge WEBSTER. I think, Mr. Chairman, that is a question I probably should ask to defer on until there is another means of responding to you on that.

Chairman GLENN. All right, fine. Another one that is along a little technical line also. In a late April press conference held by the Bundestag Investigatory Committee, German investigators reportedly confirmed exports of a tritium collection and purification facility, zirc-alloy tubes, uranium hexafluoride containers, and fuel fabrication equipment to Pakistan. The ongoing investigations of exports of nuclear equipment or material from West Germany have focused on two companies, NTG and PTB, and the German criminal justice system, they were looking to charge the suspects with violating German law banning military exports to regions of conflict.

Now this would be a more serious charge than that of violating German export regulations. Pakistan may have sought the tritium recovery equipment to remove tritium from heavy water at its CANDU type reactor at Karachi although the West German investigators recently contradicted claims of peaceful use. A build up of tritium in the heavy water moderator in such reactor is a radiological health hazard. Is, in your view, this information about Pakistan's acquisition of tritium and tritium recovery equipment correct?

Judge WEBSTER. That corresponds, Mr. Chairman, with the information that has come to me although those facts are mixed with charges that I do not know have been substantiated. Clearly, Pakistan is engaged in developing a nuclear capability. What creates problems for the United States is whether that capability has reached a point that it implicates various amendments that apply to other assistance and relief for Pakistan.

Chairman GLENN. Switching countries, are there developments of concern from a nuclear proliferation standpoint in South Africa?

Judge WEBSTER. Well, South Africa has an unsafeguarded uranium enrichment plant at its Valendaba nuclear facility. It started operating a pilot enrichment plant in 1975, and it is completing a

commercial scale enrichment plant. Although South Africa has used the pilot enrichment plant to supply enriched fuel for its safeguarded research reactor, we are concerned about the unsafeguarded enrichment material that has been and will continue to be produced at the plant.

Chairman GLENN. Let me return to the line of questioning that Senator Lieberman was on. I will follow up with a question that follows along with his last question. Has China ever supplied unsafeguarded heavy water to any other nation, to your knowledge?

Judge WEBSTER. It seems to me that one of their officials acknowledged sending some heavy water to Argentina some years ago. If I am not correct in my recollection, I will correct it for the record. But I am informed the Argentines denied it.

Chairman GLENN. GAO concluded a study for our Committee for last fall which found very significant inadequacies in foreign visitor controls at our nuclear weapons laboratories. I know we all had concerns about this. Have you followed up any on that as far as what potential proliferation threat this might pose?

Judge WEBSTER. I am aware of the report. I cannot give any firm statement as to what follow-on has taken place. It is certainly an area of concern and vulnerability that should be addressed.

Chairman GLENN. You commented on the possibility earlier that terrorists may develop or acquire. What is the possibility that terrorists may develop or acquire nuclear weapons from proliferating nations? You talked about that just a little bit, but could you expand on that a little?

Judge WEBSTER. I think I have said about all that I know on that, Mr. Chairman. It is a possibility, and the possibility increases as the proliferations increase, as the capabilities and technology fall into less responsible hands. There is, at least for the moment, sort of the why-buy-a-cow-when-milk-is-cheap, the idea that there are so many other alternative weapons more readily available and requiring less technical capability that, I think, has slowed the process of terrorists seeking to acquire this kind of capability although even in the United States there are a couple dozen nuclear terrorist threats a year, none of them having any validity. But we cannot discount the drift and the trend, and must be very alert to the possibility that a sophisticated terrorist group enjoying the sponsorship of a country which has developed that technology may come into possession of particularly smaller nuclear devices and have the fuel to energize them.

Chairman GLENN. Let me skip down just a little bit here to one other question since my time is almost up. Can you identify which Third World space and missile programs overlap? You indicated that in your earlier statement that there was some overlap between those programs.

Judge WEBSTER. I am sure you realize that those countries that are engaging in that overlap do try their best to keep that fact a secret, and this is probably not the forum for me to discuss it. But I would be happy to, again, make the same offer for a classified briefing or response.

Chairman GLENN. I appreciate that. Senator Roth.

Senator ROTH. Judge Webster, what do we believe South Africa's primary potential nuclear delivery system to be?

Judge WEBSTER. I think I am in the same position, Senator Roth. And I think that I would like to defer that question to be answered either in a classified record or private briefing.

Senator ROTH. Okay. That is all the questions I have, Mr. Chairman.

Senator LIEBERMAN. Judge Webster, let me ask you a question.

Judge WEBSTER. Your question was South Africa or China? I want to be sure that I answered.

Senator ROTH. It was in reference to South Africa.

Judge WEBSTER. Yes, my answer is the same.

Senator LIEBERMAN. Judge, has the CIA or you as Director appointed a single high level official to oversee all proliferation issues?

Judge WEBSTER. Yes, Senator, the Deputy Director for Intelligence who oversees three or four of our major analytical divisions has the responsibility. The various offices, the Office of Scientific and Weapons Research, Office of Global Issues, and a number of other divisions that focus their expertise in particular ways all report through the Deputy Director of Intelligence, and he has that responsibility.

Senator LIEBERMAN. I appreciate that. In your testimony you stated that countries that were wholly dependent on foreign suppliers for their own missile programs a few years ago are now transferring that technology to other countries developing missile capabilities. Can you identify the countries that are involved in that transition?

Judge WEBSTER. I am afraid I am circumscribed by the same problems in open hearing.

Senator LIEBERMAN. Okay. Let me try another question. A recent press report alleged that several United States firms provided equipment to a facility in Iraq involved in that country's ballistic missile development program. Do you know if this is true, and more generally, does our intelligence community monitor the activities of U.S. firms that may be missile technology suppliers?

Judge WEBSTER. We always have this problem. Let me say I do not collect domestic intelligence, but we do work closely with the FBI and the U.S. Customs Service for any indication that a United States firm might be involved in missile proliferation. If we pick it up through assets abroad, that information is conveyed back to the FBI and the Customs Service to be worked domestically in this country.

That is a high and very good level of cooperation between our agencies, but that is about as much as I can say about it here.

Senator LIEBERMAN. Can you answer whether it is true that American firms participated in the development of that facility in Iraq?

Judge WEBSTER. I am personally not—I know the article you are talking about. I am personally not aware of any information that suggests first that it was a witting participation or even that it was, in fact, true. So much of that kind of technology can go through diversion where the facility, the equipment or facilities, or even the technology passed people who were authorized to have it

who, then, through various processes divert that technology to other places. So I cannot give you any solid information about it. I know it is being pursued but I do not know the answer to it.

Senator LIEBERMAN. Okay. In your testimony——

Judge WEBSTER. I do not know that it is true.

Senator LIEBERMAN. I understand. You mentioned in your testimony that Iraq has increased the range of their Scud missiles by reducing the weight of their warheads. Is that a difficult process?

Judge WEBSTER. Well, it does involve some tinkering with the guidance system, the stability of the missile, but it is not a major deal, and I know that in some other areas, we have talked to other countries who have had shorter range missiles that they could make longer and longer range missiles that they can make shorter depending on how much accuracy they want to have at the far end.

But I think Iraq is believed to have practically doubled its range by lowering the payload.

Senator LIEBERMAN. What in your estimate is the range of their missiles now, the outer limits of how far they might reach?

Judge WEBSTER. Well, I believe the Scud is about 300 kilometers under normal circumstances so you can extend that out if you want. I am not sure what type of missiles you are talking about. We use, I think the general protocols are that a thousand kilometers is considered, below that is considered to be short range missiles, and below 300 kilometers are generally not under any control regime. But there are a number of missiles that are in that 300 to 600 kilometer range that are out there for use in Third World countries.

Senator LIEBERMAN. Can you expand on your statement that Israel's recent launch of a satellite may have fueled regional desires for an indigenous missile production capability?

Judge WEBSTER. I think when they launched their satellite, it had a lot of people worried that they were testing a missile rather than a reconnaissance satellite. Some of the same launch capabilities are involved. Some of the same technology levels were involved, and it made a number of their neighbors very nervous about what comes next. And I think I cannot go much beyond that answer than say you get an immediate response these days in that part of the world. If one country can demonstrate a capability, the others are busy trying to catch up, catch-up time.

Senator LIEBERMAN. Right. Judge, recent legislation has been introduced that would impose sanctions on countries that violate the provisions of the MTCR. If you are aware of that legislation, do you have an opinion about it? How effective do you believe it would be?

Judge WEBSTER. I really should defer the answer to that question to the Administration policymakers. It calls for policy. There are some downsides to sanctions from an intelligence collection point of view which I am not at liberty to discuss here. But I guess I happen to believe that unless there is some element of truth to legislation, the history of compliance has not been particularly reassuring. The downside of sanctions is that you inevitably get into a discussion of the intelligence that supports the view that there has been a violation.

Senator LIEBERMAN. Sure.

Judge WEBSTER. But we have to find some way to accommodate our protection sources methods to the need to educate the world on infractions that are leading to world instability.

Senator LIEBERMAN. Bonn, as you know, has recently admitted that West German firms were involved with the Libyan chemical weapons facility. But that admission obviously came only after a series of embarrassing press reports. To your knowledge, have similar reports stymied other Third World missile programs?

Judge WEBSTER. Well, if you would not ask me to go beyond my generalized answer, I think that wherever there has been exposure, there has been a tendency for those who have skirted the edges of their own laws or taken advantage of loopholes in the law to slow down their activity. There is indeed a moral suasion available on the world scene, and we have seen examples of how it works, not necessarily indefinitely. Certainly I think Germany should, the German Government should be complimented for seeking tighter laws as well as moral suasion, but the biggest weapon we have these days, I think, is to draw attention to businesses who purport to be legitimate who are engaging in activities which threaten the security of the world.

Senator LIEBERMAN. My time is about up. I will yield to the Chairman.

Chairman GLENN. Thank you, Senator Lieberman.

How do you define a missile as being nuclear capable, and which ballistic missiles under development in the Third World meet that definition?

Judge WEBSTER. Well, the MTCR defines a nuclear capable missile as one that can deliver a 500 kilogram or 1,100 pound warhead a distance of 300 kilometers. While this threshold is a reasonable general minimum standard for a nuclear warhead, each country trying to mate a nuclear weapon to a missile will have its own design specifications and limitations that will either fall under or exceed that standard. That is about as much as I can say about it in a public forum.

Chairman GLENN. You stated there are some 15 nations that will be producing ballistic missiles by the year 2000. Is that a pretty firm estimate? Are there any additional nations you can see that might get that capability?

Judge WEBSTER. Well, there are some countries that are capable of developing ballistic missiles but for political or economic reasons have chosen not to do so. If they get caught in the middle of a regional conflict or potential for conflict they may decide for reasons of self-defense that they want to get into the act and play with the big fellows.

Chairman GLENN. Also of concern to us has been the fact that there might be chemical weapons used on that. You commented on that in your previous testimony.

Judge WEBSTER. I think there is a very high probability that chemical weapons would be used by such countries and others in advance of nuclear capability because it is not that tough to do.

Chairman GLENN. So much easier. You testified on that before. You had excellent testimony. I remember you said that you could have a credible chemical weapons plant in an area the size of this room.

Judge WEBSTER. That is right, and you could convert it to legitimate facility in 8 or 12 hours and put it back when the heat is off.

Chairman GLENN. A product of that kind of a laboratory could be used as a devastating weapon on a missile as well as a nuclear weapon.

Judge WEBSTER. I think those Scuds that are just sitting out there, it is an option that is current available.

Chairman GLENN. How accurate do these missiles need to be in order to be militarily effective? Can we tell what type of warhead will be used on a missile if we know that missile's accuracy?

Judge WEBSTER. I think the answer to that is no because there are so many variations such as the one that Senator Lieberman asked about where they modify their warhead to achieve a different range capability.

Chairman GLENN. What is your definition of short or long-range missile?

Judge WEBSTER. Well, the MCTR, I think, defines a thousand kilometers or above in the short range. I think it goes to 1,000 to 3,000 kilometers is in the short range category.

Chairman GLENN. We can ask Mr. Lehman about that later. I think the arms control people have very definite ranges that they specify for short, intermediate and long-range missiles?

Judge WEBSTER. Yes, they do, and I think that is a thousand kilometers, 1 to 3, and intermediate would be 3,000, between 3,000 and 5,500 kilometers. And intercontinental above that.

Chairman GLENN. You mentioned that space launch vehicles can be converted into ballistic missiles. What is needed in order to make that conversion? Just a different guidance system?

Judge WEBSTER. That is my understanding.

Chairman GLENN. Right. Can other military missiles such as surface to air missiles be converted into surface to surface missiles? Have you seen any of that going on?

Judge WEBSTER. I am informed that it can be done. It has been done, but I cannot specify in an open forum.

Chairman GLENN. What are your feelings about cruise missiles? Do they pose a significant proliferation threat compared to ballistic missiles in the next decade or so?

Judge WEBSTER. I guess in that one I am in a sort of watch and see mode. The additional technology that is involved there would seem to me to be an impediment to rapid development of cruise missiles.

Chairman GLENN. Our technology and that of the Soviets is going ahead quite rapidly in that particular field. That is no secret, and the question was whether you felt that some of these Third World countries really are making the same kind of strides that we and the Soviets have both been making. I know they are very highly technical guidance systems that we have to have to make those systems work.

I would presume that most Third World countries do not have that capability, at least not yet.

Judge WEBSTER. When we talk about acquisition we sometimes have to distinguish between getting a system or getting an indigenous production capability. As you know, this also depends upon global positioning satellite systems for the use of cruise missiles.

And as that proliferates, we could probably see a trend toward cruise missiles. It would be more likely in my opinion that Third World countries would seek to acquire the whole system if it would be made available to them by another country rather than to go the hard route at least at this time. They have enough of their plate.

Chairman GLENN. When we get ready to do it, when we find something wrong around the world, we are going to send a demarche to one of these foreign governments about the activities of their firms and individuals, do you get involved with that? Is your advice counseled on that?

Judge WEBSTER. We are very much involved. Our approach is to supply reliable intelligence and to get it into a shape that it can be used by our policymakers in making these demarches, and from time to time we are of assistance in trying to seek through our own contacts and liaison clarification of statements that have been made to our officials or public statements that are ambiguous in their inference with respect to missiles, and to try to seek clarification that way.

We can be used in other ways, but I want to emphasize that the intelligence community does not have a policymaking role in this area.

Chairman GLENN. Thank you. My time is not quite up yet, but I think in the interest of moving along, we are going to have to move along. We have other witnesses here. Go ahead. Do you have any other questions?

Senator ROTH. No more.

Chairman GLENN. No more questions. Do you have anymore?

Senator LIEBERMAN. No.

Chairman GLENN. Judge, thank you very much. We may have some additional questions to present from other members of the Committee, and we appreciate your being here this morning. It has been a long session, and we appreciate your willingness to share this information with us this morning. It has been very, very helpful.

Judge WEBSTER. Thank you, Mr. Chairman. It has been a privilege.

Chairman GLENN. Thank you very much. I would invite the attention, which I should have done earlier, of the audience here and the press also, to the charts over here on the wall that detail some of the things Judge Webster was talking about this morning.[1]

Our next witnesses this morning will be Hon. Reginald Bartholomew and Hon. Ron Lehman. Mr. Bartholomew is Undersecretary of State for Security Assistance, Science and Technology. Mr. Lehman is Director, Arms Control and Disarmament Agency. Gentlemen, we are sorry that you had to sit and wait all this time, but I am sure you found it very interesting also to hear the Director's testimony this morning, and when we have an opportunity like that, we like to take advantage of it, as well as your own expert testimony, of course.

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[1] The charts referred to may be found starting on p. 88.

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Ambassador Lehman, would you lead off please this morning with your testimony, and then we will have both of your statements, and then we will get to questions.

TESTIMONY OF RONALD F. LEHMAN II, DIRECTOR, ARMS CONTROL AND DISARMAMENT AGENCY

Ambassador LEHMAN. Thank you, Mr. Chairman. I have a prepared text, and I can present that in its entirety or if you wish, I can make a few introductory remarks and submit it for the record.[1]

Chairman GLENN. We would appreciate making the statement available for the record. It will be published in its entirety, and you can summarize the statement. That would be fine. That would be welcome.

Ambassador LEHMAN. Thank you, Mr. Chairman. As you mentioned, this is not my first appearance before this Committee. In fact, it was in 1983 that I was last here, and it was to testify on the question of nuclear non-proliferation. So I welcome this opportunity to return and since this is my first testimony since becoming Director of the Arms Control and Disarmament Agency, I think it is particularly appropriate that the issue should again be non-proliferation. Your Committee has played a central role in dealing not only with nuclear non-proliferation but with the other proliferations that are causing us increased concern.

In that regard, the President has made it very clear that he wants more energy and innovation applied to addressing these very, very difficult questions of weapons proliferation. To be successful, the Executive Branch is going to have to work closely with the Congress. Within the Executive Branch we are going to have to have closer and better coordination and cooperation, and with our friends, allies and other nations around the world we are going to have to increase the interaction. I need only remind everyone of the stories that appear everyday in the newspaper concerning the threat of the various weapons proliferations and the significance they bring to the modern world.

The desperation that one saw during the Iran-Iraq War makes it very clear that it is likely in some of these regional conflicts that any weapons that are available may well be used and this is of great concern to us. It calls into question not only regional security issues, but could conceivably call into question the basis of global security as it is now structured.

Your hearing today is focused on nuclear non-proliferation and the problem of missile proliferation. These are only two of the proliferations that cause us concern. You have already had some testimony on the problem of chemical weapons proliferation and in your hearing today other areas of concern were mentioned. For example, the problem of nuclear submarines.

But let me focus on the purpose of this hearing, nuclear non-proliferation and missile proliferation. There are many similarities in these problems. That is to say that both grow out of many of the same motivations, concerns about local security, concerns about na-

[1] See p. 51.

tional image, and they are in many ways the byproduct of industrial and technological growth around the world. And indeed, they are made more complex by the fact that so many weapon systems rely heavily on dual capable technologies. The tools that are available to us to deal with these problems are, for example, treaties. In the case of nuclear non-proliferation, we have the Non-Proliferation Treaty, and we have a treaty such as the Treaty of Tlatelolco that deals with Latin America. These are very helpful in establishing, at least, minimum norms.

In the missile proliferation area, we have no such treaties. We are engaging in a review of this overall issue within the new Administration. And one of the questions that we will obviously have to address is whether there is a role for a treaty or treaties in this area, or whether the missile proliferation issue is really quite different than the nuclear proliferation issue. A second tool that is available to us is the development of an international safeguards regime. Again, we have the IAEA safeguards in the nuclear area, but we have no such institutional basis clearly established in the missile proliferation area.

So this is another area where we have to look and see what can be done. Both of these proliferation issues are addressed extensively through the tool of export controls. This is an incredibly complex area because, not only the United States, but many nations around the world, are dependent upon high technology, which is not so high a technology anymore, trade as a part of their economies, their well-being, and their balance of trade. Most trade around the world is not extensively monitored, and it is very difficult to monitor all of the interactions that nations undertake. And we in the United States with respect to munitions control, dual use technologies, especially those related to nuclear capabilities, have more resources and computer technology, for example, to apply to this problem.

But many other countries around the world do not have these resources, and in many cases, do not understand the problem. So there are a lot of things we have to do in this area as well. But in addition, we have to recognize what the fundamental causes are of these proliferation efforts and try to address them, and this has to be undertaken with a very energetic diplomatic effort bilaterally and multilaterally. And this again we have tried to do and will continue to do in both the nuclear non-proliferation and the missile proliferation areas.

Now the Arms Control and Disarmament Agency has always played a vital role in this process. Mr. Chairman, you remember well that it was the first director of the Arms Control and Disarmament Agency and his deputy who negotiated the Nuclear Non-Proliferation Treaty. Our deputy just went to Mexico City as the head of the U.S. delegation to the conference that was held there on the Treaty of Tlatelolco. We also have an extensive mandate by law to be looking at exports and these nonproliferation matters. Indeed, we within the Agency have a very large number of very high caliber experts on technical issues and policy issues which we can apply to this. And our mandate is perhaps narrower than the mandate of other departments and agencies, although we all are concerned about the problems of proliferation, because our focus is

less on the broader diplomatic issues, less on the questions of, for example, defense cooperation, but much more on the issue of nuclear nonproliferation.

In the end, decisions have to be made in a broader context than that which we bring to bear, but we intend to bring to bear our perspective and to make sure that it is considered in any decisions that are made. I have only been on the job now a few days, but I am looking internally to see first of all how to make the best use of the resources and people that I have. And because this is a new Administration, we may well have some opportunities to make some changes that will reinvigorate the process, and I will be consulting with you on that. But I just want to thank you for having us here today.

Chairman GLENN. Thank you very much.

Ambassador Bartholomew.

TESTIMONY OF REGINALD BARTHOLOMEW, UNDER SECRETARY OF STATE FOR SECURITY ASSISTANCE, SCIENCE AND TECHNOLOGY [1]

Ambassador BARTHOLOMEW. Well, Mr. Chairman, I am, in fact, a new boy. This is my first appearance before the Committee. I am not entirely a new boy where non-proliferation is concerned because I was struck when you mentioned in your statement, Mr. Chairman, that we are 15 years after the Indian blast because I remember that at that time I was in the State Department, and I was very active in participating in the development, the whole effort that stemmed from that, the London suppliers group, and the guidelines and the like.

Though I have to say I have been in and out of the issue since then, and am now still in the process of getting back up to speed. I for my part, throughout, however, have—I would like to say this to you—had great admiration for the work of this Committee and your work and your role particularly, Senator Glenn, both in legislation in this area, advice and counsel, and sounding board, and yes, I have to admit it as prod as I look at the reality of the situation.

Chairman GLENN. Thank you.

Ambassador BARTHOLOMEW. I do not think the Bush Administration, I hope the Bush Administration is not going to need any prodding in this area, Senator, because I think that the President has made already very, very clear the high priority he attaches to it and particularly to expanding the effort into the area of the new proliferations. For my part, I have been as Undersecretary of State for Security Assistance, Science and Technology specifically charged by Secretary Baker with coordinating the department's work in this area. And I have also been charged as such to chair an interagency coordinating committee inside the NSC system across the span of our non-proliferation efforts.

I might say one point in terms of general approach, and that is I think it is rather important that is that we sit here to recognize that the proliferation, any of the proliferations is not an American

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[1] See p. 61 for Mr. Bartholomew's prepared statement.

concern, an American interest, an American problem. It does, in fact, belong to everyone and should belong to everyone. I think it is necessary for us to accept the role of leadership but also never approach countries with the idea that we are asking them to do something which, in fact, is sensible and more often than not at least as much in their interest as it is in our own.

We will be doing some reviews to take a fresh approach in the nuclear area. I must say I am not entirely sure myself how much new there is to be done there. The regime that has been developed over the years including with the help of this Committee is impressive. I think it is a matter of its extension and further application, not to prejudge any of the questions we might want to address. I think there also we know what the most acute regional cases are that we need to pursue. I am thinking of South Asia for one in this case and pretty much the dimensions of it.

In the missile proliferation area, as Ron Lehman said, here we face a new and different problem. We are at a beginning of a problem. We have pressures on the demand side if I can use that analogy, political, economic and military pressures, people in country looking for missiles. We have pressures on the supply side, some of which I agree with Ambassador Lehman, in terms of the industrial incentives and the like, and I cover some of these in my statement.

I think our basic policy here in this area is going to be very much, departing from the fact that we are not alone in this, we are going to have to show leadership and we are going to have to act with others. I think our basic policy though is going to be to drive up the cost that is involved and reduce the incentives on both the supply and the demand side, trying to block or delay the expansion of these capabilities.

We made a major step with the Missile Technology Control Regime. It is not as perfect as it might be, perhaps not even as good as it might be. It has been effective. We will want to look at ways that we can make it more effective and look at other instruments. But by way of concluding these initial remarks, I just want to say we will be working hard on these questions and we look forward very much to working hard with this Committee. Thank you, Mr. Chairman.

Chairman GLENN. Thank you very much, both of you.

Ambassador Lehman, you recently came from the Defense Department, had similar responsibilities over there, and followed this whole area very closely. As I understand it, when we make a nuclear agreement, DOD does not really have to sign off on that; is that correct?

Ambassador LEHMAN. That is correct.

Chairman GLENN. Should that not be a requirement because it seems to me that DOD would be responsible for dealing with a terrorist threat or other concerns? Should that not be, should not DOD be consulted on that?

Ambassador LEHMAN. DOD should be and is consulted. DOD has fought hard to make sure that wherever possible the Department of Defense will be informed and involved, not only in nuclear cooperation, but in other areas of technology transfer.

Chairman GLENN. You heard Judge Webster's testimony this morning and also the comments just made by Ambassador Bar-

tholomew. In ACDA now, putting your ACDA hat on, which of the threats that you have heard about this morning do you feel require the most urgent attention, and which can ACDA take on most effectively?

Ambassador LEHMAN. Well, let me say that the threat from nuclear weapons remains a more fundamental threat because of the destructive nature of those systems. On the other hand, as we have seen in the Middle East in the Iran-Iraq War, we are faced now with the use of chemical weapons, and we have had less experience in trying to keep a handle on that proliferation than we have had with nuclear proliferation. And now we have this further complex problem of missile proliferation. So I think they all have to have high priority, but we have more unclear ground ahead of us in the area of missile proliferation than I think we do in the other areas.

Chairman GLENN. Let me get into the organization that you have, and this gets a little confrontational, I guess, but Secretary of State Baker recently characterized ACDA's role in the new Administration as a rather limited one compared to what my thoughts were about ACDA. I thought he overdid it, but that is my own personal opinion. He focused on ACDA's main role as being that of providing technical assistance to the State Department and other agencies on specific arms control issues. What role do you see ACDA playing here? That was not quite what I thought ACDA was supposed to do, and yet that is what Secretary Baker expressed his view as being.

Ambassador LEHMAN. Well, I think Secretary Baker has made it clear that it was not his intent to limit ACDA at all. Indeed, I think in my discussions with Secretary Baker, he understands that we are indeed a reservoir of an extremely wide range of technical and policy talent, and we do focus on these issues in greater detail than do many others. Nevertheless, our statutory mandate is much broader and I am quite confident that my relationship with the Secretary is going to be extremely close, that relationships in the interagency process are going to be better than ever, and that my ability to advise the President and the other members of the Cabinet will be uninhibited.

Chairman GLENN. Ambassador Bartholomew, China has in the past been a problem as a supplier of nuclear and missile technology. Do you have concerns today about China's behavior in this area? They are still marketing their nuclear capable M series of missiles. We do not have any commitment from China that it will not export such missiles, and does China have any ongoing nuclear cooperation with Iran, Pakistan, and other nations? Are you concerned about these areas?

Ambassador BARTHOLOMEW. Well, Senator, we do have, have had high level discussions with the Chinese about the missile proliferation problem and about the actions of all countries that might have a handle or a hand where this is concerned. They have told us that they will adopt and follow a prudent and responsible attitude on weapon sales generally including missiles action. They have specified for us——

Chairman GLENN. Did they go ahead and define "prudent and responsible"?

Ambassador BARTHOLOMEW. Well, in fact, Senator, they talked in terms of considering the self-defensive needs of the country concerned, considering the peace and stability of the region concerned in that manner. As matters stand at this point, I do not think that we have any evidence that they have sold any missile beyond the CSS-II to Saudi Arabia.

Chairman GLENN. That was a pretty big sale.

Ambassador BARTHOLOMEW. It was indeed, and it was after that, as you know, that we, shall I say, intensified our discussions. What I am telling you is in terms of the responses we get comes after that. I think that that is something that we want to continue talking to the Chinese about with an effort to sort of deepen and expand the notion that no one's interest is served by pursuing this kind of activity. But I come back in the sense that we have gotten the responses that I delineated in the first part of my answer.

Chairman GLENN. A Chinese official recently in this country who is involved with some of that effort when I asked him about that, he said, well that was an aberration. I trust that his word "aberration" meant the same as it meant to me. I hope that it was just that and does not mean that they are going to continue sales like that. But that sale to the Saudis really disturbed me because the Saudis then have to either have a nuclear warhead or a chemical warhead to use it because it is not accurate enough to use just HE and hit a good target. So that was of great concern, and I hope that the Chinese are not out selling more of those things around the world. We are on the 5 minute this round. So Senator Roth.

Senator ROTH. Thank you, Mr. Chairman. Welcome, Ambassador Bartholomew and Ambassador Lehman. I think you heard some of the questions I propounded to Bill Webster and his testimony. He spoke of a number of companies that were known to be selling material of use in the proliferation of nuclear weapons. I asked him what could be done about that, and I would like to ask either of you gentlemen the same question. We do have this agreement with six of the NATO nations in the missile area. What measures can we take to prevent these companies that are known suppliers to new companies seeking nuclear weapons? Is there anything we can do? Would it be advisable, as I suggested, to publicize them? Ambassador Bartholomew?

Ambassador BARTHOLOMEW. Well, the first line of responsibility lies with the Government of the party to the MTCR in the first instance. It is up to them to bring to bear the necessary controls in furtherance of the controls that are in the MTCR, apply those controls and take the actions required to discipline and enforce.

Now we need to do some further work with them, and this is one area of improvement in terms of developing similar approaches on the whole question of the nature of controls and their application. We have seen positive developments in taking this question of export controls more generally. I think Germany is a case in point. The work that they have done recently in terms of their laws, in terms of more people, in terms of stiffer penalties in this. So the first line in terms of pushing against diversions or action outside the context of the MTCR by companies has to be with the governments themselves.

Now in terms of what we can do where our partners are concerned, certainly when we have information, when we can solve the sources and methods problems that Judge Webster was talking about because that is a problem, when we get the information in a timely enough basis, then we can make the demarche to the host Government, in effect saying look we have this, something seems to be going on here; we think it is very important that you get on top of it.

We have not hesitated to do that in the past. We have not hesitated to use some political leverage where this is concerned. I think we need to be, and this is my own view, even more vigorous and quick in the future, try to find ways of solving some of the constraints that have been on this to move ahead on this line.

Senator ROTH. Let me ask you this. If the host country fails to take any action, would you see any merit in the United States naming these companies, perhaps even some kind of sanctions?

Ambassador BARTHOLOMEW. Let me broaden the question a bit. In terms of the whole question that you raised with Judge Webster about publicity, I want to say very carefully that we are not averse to publicity. I think that there is absolutely no doubt that some of the publicity around some well-known cases has played a useful function in consciousness raising, upping ante, warning because of the public indignation that it has created, and because of the potential costs for firms and individuals to be seen to be engaged in that kind of activity.

So I start from a presumption that publicity is not, even though the normal diplomatic tendency is to shy away from it, that it "ain't" necessarily a bad thing, to the contrary. Now how that is done, when it is done, whether we do it as a Government, take it upon ourselves the responsibility of standing up, publicly putting people in the dock, these are some things we have to think about.

In terms of sanctions, Senator Roth——

Senator ROTH. I am suggesting sanctions against the individual companies.

Ambassador BARTHOLOMEW. I understand that. Again, sanctions, yes, we would. But sanctions to be applied by the host Government in support of the enforcement of some of the undertakings that have been made in terms of missile control or nuclear controls or the like. That seems to be the best way. That is what we do.

Senator ROTH. I guess my concern there, Ambassador, if the so-called host country does not take action, what can we do? I mean you have suggested that we could go ahead and publicize, and if we had the sufficient facts, the circumstances were correct. Would direct sanctions against foreign companies be viewed as an assertion of U.S. extra-territorial jurisdiction?

Ambassador BARTHOLOMEW. That is a problem that we encounter immediately, Senator Roth. I mean if you take the Missile Technology Control Regime as an example, this, like I might say, COCOM, the coordinating committee for the control of our exports to the East, these are voluntary undertakings that are involved. I mean they are not treaty arrangements. If you say to me, well, why are they not treaty arrangements, it is because it was easier. At least in the first phase we do not know where we go from here to get the necessary cooperation if it were a matter of this voluntary coopera-

tion with the governments ultimately retaining a certain degree of sovereignty where final decisions are concerned.

Now if in that context, taking the Missile Technology Control Regime, we were to take it upon ourselves to say that we were going, in effect, to sanction companies in other countries, we and in some way I think we would be taking upon ourselves the role of enforces, sort of enforces, central enforces of the Missile Technology Control Regime, and then I would begin to worry very much about whether we would drive countries away from cooperation rather than bringing them closer to cooperation.

I repeat. I think our best bet is to go right directly at where the problem is. The problem is with governments, how we behave and how governments behave, and that should be the main line of our action.

Senator ROTH. Well, if I might, Mr. Chairman, just make one further comment. My concern is that, as you point out in your opening remarks, that by the end of the century we could have as many as, I think, 20 countries with competence in nuclear weapons and missiles, and I can appreciate and agree with you that if we can combat this development through the host country, that is desirable.

But what concerns me is that if we find that is impossible, what can we really do to stop this spreading, this proliferation, and for that reason I think we have to play a pretty tough role if we are going to be effective in the future. So that I am not suggesting necessarily that sanctions are the answer, but it seems to me that this is something that ought to be carefully considered. Certainly, those that are known to be suppliers, we ought to have some way of dealing with that problem, it seems to me.

Chairman GLENN. Toshiba.

Senator ROTH. Exactly.

Chairman GLENN. Yes

Senator ROTH. Thank you, Mr. Chairman.

Chairman GLENN. Senator Lieberman.

Senator LIEBERMAN. Thank you, Mr. Chairman, Ambassador Lehman, Ambassador Bartholomew. Let me just follow up on Senator Roth's line of questioning and ask how tough we should get with the countries that are involved in the proliferation of nuclear weapons, some of whom are our allies, such as Argentina, Brazil, India. Should we attempt to create a quid pro quo—if you intend to continue to receive American cooperation, and aid in a host of areas, then one condition is that you do everything you can to stop the passage of missiles and missile technology from your countries?

Ambassador BARTHOLOMEW. Senator, if I pause, it is because that question goes right at one of the most difficult elements in managing this business. We face that question time and time and again because we insist, especially in certain cases where we are dealing with friends or people with whom we have a wide ranging relationship. We face the question of what leverage is there in that relationship. We face the question of such issues as if you use it once, it is use and lose. I mean in the sense of breaking your relationship, and once you break a relationship or you diminish it greatly, you have diminished even the ability to communicate, convince, dissuade, you know. I cannot answer the question in the abstract.

I take the point. What I can assure you of, though, is that the priority attached to proliferation in the span of our relationships with these countries has weight and is being added to in the sense of how much risk we will run, how much leverage we will use, and the kinds of tools we use. That may be an unsatisfactory answer, but I do not think there is a more specific one I can give you.

Senator LIEBERMAN. I accept the priority that the Administration is giving to the control of the proliferation of nuclear weapons and missiles. Let me just see if I can understand what the elements of the policy are. You have just said, Ambassador, that this is an important element in our foreign relations, certainly with friendly nations. We want them to know that it is important to us that they not contribute to the spread of nuclear capacity and missile capacity around the world.

Export controls, I gather, are another element. What else? Do we have in mind to attempt to negotiate a global treaty which may supplant or improve on previous efforts to control the spread of this technology? Is that a goal of the Administration at this point?

Ambassador LEHMAN. Senator, that is a question that is under review. As I said, we have that in the nuclear non-proliferation area, and it has played a central role, but in the area of missile proliferation, it is a somewhat different world. The participants in missile technology, as you pointed out, are in many cases our closest friends and allies. Many of these technologies have legitimate civilian uses. It is very difficult to talk to some of the countries in the developing world and say we want to deny you the ability to do what we do routinely in a commercial way.

The first step was the Missile Technology Control Regime in which we frankly sat down with our best friends, some of our very best friends, who had this capability, and we said let us begin by cooperating among ourselves in this area. It is right now not evident that there is a simple treaty or even combination of treaties that completely gets a handle on this problem. Nevertheless, we are going to look at that, and we are looking at it very carefully.

Senator LIEBERMAN. It is still an open option to propose?

Ambassador LEHMAN. It is still an open option.

Ambassador BARTHOLOMEW. If I may add to that, Senator, there is also a time line here in terms of which options you do when. I mean we have the Missile Technology Control Regime. We can use multiple options. We can have something like that. We can have a set of bilateral relationships.

There is still the question of how best to, let me be diplomatic and say cooperate with the Soviets and the Chinese in this regard. For example, you could conceive of sort of a multiplicity of instruments which we are looking at.

Senator LIEBERMAN. Let me ask you to expand on that last point of my question. I asked Director Webster about that. How do you evaluate the opportunities here for greater cooperation with the Soviet Union, as we seem to be cooperating with them on the whole question of arms control? And on the specific question of joint efforts to curb the spread of missile technology—do you think they are receptive?

Ambassador BARTHOLOMEW. Well, I think there are prospects. This was an issue that Senator Baker—the last time somebody said

Senator Baker, he said thank you. [Laughter.] Secretary Baker raised when he was in Moscow with Shevardnadze, and I was with Secretary Baker and pursued that in the discussions with the Soviet counterparts. I think that there is a prospect there. We think that there is. What we tried to do with the Soviets was to do some greater consciousness raising, I think, in terms of the weight that this element, the missile and chemical elements of proliferation have as the nuclear, the weight that those should have in our agenda.

Some of the questions we face with the Soviet Union is making sure we get fully reciprocal, shared, common assessments of what the problem is, not just generally but also in terms of specific cases because quite frankly, and I have no hesitation in saying this publicly, they know more about certain particular projects of concern than we do, in terms of the relationships that are involved.

Senator LIEBERMAN. In the Third World?

Ambassador BARTHOLOMEW. Indeed.

Senator LIEBERMAN. Right.

Ambassador BARTHOLOMEW. Indeed, and also then to look at possible forms of cooperation between us, bilateral, whether they connect with the MTCR. There are a number of variants there. But let me say this. I do think that the Soviets are ready to recognize that they have an interest in this area as well as we. Indeed, if you look at geography, they ought to have at least as great an interest as we in this area, and we hope to be able to do something with that interest.

Senator LIEBERMAN. I appreciate your answer. If in fact the Soviet Government is interested in reducing regional conflicts and the prospect of new regional conflicts, then non-proliferation of nuclear and missile technology certainly would seem to be an important element to pursue. They are in much closer to the missile range of some of the most unstable governments in the world than we are.

Chairman GLENN. Senator Levin, are you ready to go?

Senator LEVIN. Thank you, Mr. Chairman. Ambassador Lehman, a couple questions of you first. You indicated that we are giving a higher priority to proliferation issues with our allies.

Ambassador LEHMAN. That is correct.

Senator LEVIN. As I understand it you testified to that. Can you tell us a little more about what you mean by that? Higher than before; is that what you mean?

Ambassador LEHMAN. Yes, as a matter of fact. I mean part of our problem has been identifying the areas of concern. It is nice to go out and say we are concerned about, for example, missile proliferation. But what it takes to build a missile is a complex range of technologies, and many governments have neither the policies, the institutions, nor the laws, to even understand what they should be doing to address this problem, or where the threat is. And many governments do not know who trades with whom, and with what. And frankly, we are not perfect either.

Senator LEVIN. My question is, is there a point in time when this higher priority was assigned that you could identify for us?

Ambassador LEHMAN. Well, I think President Reagan, when they worked out the Missile Technology Control Regime, when it was

completed, and an announcement was made, it was a part of that overall process in which the various departments and agencies began to focus more on the missile proliferation area. But President Bush has highlighted this.

Senator LEVIN. What year was that?

Ambassador LEHMAN. 1987, I believe.

Senator LEVIN. So, what you mean is that since 1987 we are assigning a higher priority to proliferation issues with our allies? Is that it?

Ambassador LEHMAN. Well, I am saying in 1987 we assigned an even greater, higher, priority, and now President Bush has made it clear that we have to do much more partly because there is no silver bullet in this area. It is a very complex area. There is no simple solution, no treaty you can sign that makes the problem go away. It is just going to take a lot of resources and effort.

Senator LEVIN. One of the commitments that we have made to countries that signed the Non-Proliferation Treaty, as I understand it and remember it, was that we would seek to negotiate a comprehensive test ban. One of the arguments that other countries make while we are trying to stop them from gaining nuclear weapons, is that we continue to use them ourselves for deterrents. What are we doing to negotiate a comprehensive test ban? There was some language in a treaty that we signed, that committed this country, I believe, at least in a preamble, to pursuing a comprehensive test ban negotiation? Are we currently engaged in negotiations for a comprehensive test ban?

Ambassador LEHMAN. The Article 6 of the NPT does not mention a comprehensive test ban per se. But it is clear that as part of the deal, the nuclear weapon states have an obligation to work towards reduction and ultimate elimination of these systems, and that is our policy, and that is what we are attempting to do. And in that regard we have, I think, a very good story to tell.

Senator LEVIN. But I am talking about a test ban. Are we currently engaged in negotiations relative to a comprehensive test ban? I am not talking about reductions in the possession or manufacture, but just the banning of the tests.

Ambassador LEHMAN. There are two international discussions and negotiations going on. We have the work of the Conference on Disarmament, the 40 nation conference, that is focused very much on questions of nuclear testing limitations. But as our first priority, we have our bilateral negotiations with the Soviet Union which are currently focused on developing the verification protocols for the Peaceful Nuclear Explosions Treaty and the Threshold Test Ban Treaty.

I can report that we have essentially completed the draft of the Peaceful Nuclear Explosions Treaty although it is under technical review and we will be returning next month to negotiation to pick up on that and also our work on the Threshold Test Ban Treaty verification.

Senator LEVIN. Does that mean that at the moment we are not engaged in negotiations on what has been known as a comprehensive test ban?

Ambassador LEHMAN. At the moment we are not.

Senator LEVIN. We are not. Have we ever been engaged in those negotiations?

Ambassador LEHMAN. Yes. There were a series of trilateral negotiations, the UK, United States and the Soviet Union, but those talks have ceased.

Senator LEVIN. Did we break them off, or did somebody else break them off?

Ambassador LEHMAN. We did not resume them.

Senator LEVIN. And my final question has to do with the relationship between foreign aid and the testing nuclear devices. In 1977, an amendment to the Foreign Assistance Act provided that we would use foreign aid as leverage to keep countries from testing nuclear devices. There is no linkage made in that amendment, as I understand it, to manufacture or possession of nuclear devices. Is it the Administration's position that we should modify the Foreign Assistance Act to link provision of foreign assistance to the manufacture or possession of nuclear weapons?

Ambassador LEHMAN. Senator Levin, I would like to take a look at that, but I believe that the current policy, and I think that it may well be by law, does in fact deal with that question of possession short of testing.

Ambassador BARTHOLOMEW. The Pressler Amendment.

Senator LEVIN. Pardon? Is that law?

Ambassador LEHMAN. I believe so.

Senator LEVIN. So that the mere possession now is linked to foreign assistance?

Ambassador LEHMAN. I am told that that is with respect only to Pakistan.

Senator LEVIN. Narrowly, to that one country?

Ambassador LEHMAN. That is under the Pressler Amendment, yes.

Senator LEVIN. Now, is it the Administration's position that it be broadened beyond that one country?

Ambassador LEHMAN. We have not proposed that.

Senator LEVIN. And why is that?

Ambassador LEHMAN. We are reviewing our current policy right now, but we have felt that these issues are so difficult and sometimes so delicate that we would like to have as much flexibility to deal with them as we can.

Senator LEVIN. My time is up. Thank you.

Chairman GLENN. Thank you. When we see things wrong in the international field, we sometimes send demarches. We have an article in Nuclear Fuel Magazine which says we have sent over 100 diplomatic demarches just to West Germany alone in this area over their exports of nuclear technology. Is that right? One hundred demarches just to one country, just to West Germany?

Ambassador BARTHOLOMEW. Over what time period, Senator?

Chairman GLENN. Any time period.

Ambassador BARTHOLOMEW. Well, I cannot verify that figure, but I would not——

Chairman GLENN. Well, you break it down year by year, whatever it is.

Ambassador BARTHOLOMEW. I would not be surprised if it were correct. I would not be surprised.

Chairman GLENN. What have they done? What have been the responses? Is it like sailing paper airplanes into the Grand Canyon or something? Do we ever hear anything back? That is sort of unbelievable.

Ambassador BARTHOLOMEW. We do. Some of them that are called demarches may be down at the level of contacts. We do a lot of talking to our allies on a continuing basis. Quite often it is a matter of sharing information, sharing concerns, talking about what we are going to do at the NPT. If you want to classify everything that we do under that heading as a demarche, it would be misconstrued.

Chairman GLENN. Well, I do not know if that is the definition or not. If I thought that the demarches were restricted to those areas where we have concern about what they are doing, and we are expressing a displeasure with what they are doing, is that not the definition of a demarche?

Ambassador BARTHOLOMEW. It would be normally with some action point. That is right. That does not—if that is the figure, as I say—I do not have anything that confirms it—but I would not be surprised at it. What I will say is this. I do think that there are grounds for us to be perhaps—I want to look at the record more closely myself personally, but at least on the face of it, let me use the new boy's luxury to say that there probably may be grounds to have some greater vigor persistence and follow-up in certain cases where this is concerned. But I say that to some sense, as I say, with the luxury of not having been there and not yet fully having reviewed the record, Senator.

Chairman GLENN. We would appreciate a review of that and let us know what you think about that. Also under the Non-Proliferation Act, the Administration is required to keep Congress, "fully and currently informed about proliferation related developments." I certainly do not recall any number of demarches coming through that we have been informed about at this end of the avenue anything approaching that 100 demarches just to one country, let alone all the other countries involved. So if we are to be kept fully and currently informed, let me just state here we have not been and we expect to be, and you have stated you are the new boy in the office there. We expect to be informed. So I hope you can take that under your wing and make certain that we are where these demarches are sent.

Ambassador BARTHOLOMEW. I hear you, Mr. Chairman.

Chairman GLENN. Let me ask both of you one. What role do supercomputers play in this whole thing? When you get into design of weapons and Third World countries, and we have requests right now for supercomputers being considered for export to Brazil, Israel, India. I am sure that these are ostensibly for some other purpose, but they carry with them a proliferation concern that is a very genuine one when you get these high capacity computers.

Do we deny any of these licenses on that related ground?

Ambassador LEHMAN. Mr. Chairman, we do. We have permitted the export of some supercomputers to countries that cause us concern under very tight controls and with written assurances from the governments. Nevertheless, this has been an area of great concern to us, and it is being made more complex because what is a

"supercomputer" is changing. As the computer revolution continues, increasingly valuable capabilities for weapons' design and missile design for that matter are going to be appearing more and more widely in industrialized countries and developing countries even around the world.

Nevertheless, it is an important tool, and we have tried to keep a tight reign in this area.

Chairman GLENN. We have been willing to overlook a great deal in this non-proliferation area because of other interests, Pakistan being one example. We wanted to support the flow of weapons through Pakistan to counter the Soviets in Afghanistan, and so some of the normal cutoff that might have occurred of aid to that country, to Pakistan, did not occur because of our other concerns even though the law is very clear that if they are developing nuclear weapons, why we should take action.

Judge Webster said this morning that nuclear activity with India and Pakistan have all the earmarks of a race. What is going to be our proposal here? Are we going to just continue aid regardless of that, regardless of our responsibilities under NPT to cut back on our association with countries that violate what we see as proper things that they should be doing with regard to nonproliferation? Have we had a validation of that situation? It has to come up in September of this year. We have Prime Minister Bhutto coming to this country shortly. Will the nuclear matter be on the agenda with her as it has been with Zia, as it has been with everybody going clear back to Bhutto's father's days when he said they would eat grass to get similar capability with India?

But we do not seem to be willing to do anything about it? We are not willing to put teeth into it. And yet the law is very clear on what should be done, but we always make some excuse and overlook it somehow. What will be this Administration's policy with regard to situations like that?

Ambassador BARTHOLOMEW. Senator, I do not think there is any intent whatsoever to overlook, if I may start where you ended. There is the question of the certification that has to be made later this year, I believe under the terms of the Pressler Amendment, the certification that that requires. And certainly the Pakistanis are aware of all the implications that are involved in that certification, and what could flow from the decisions that might be made in connection with that.

Now in terms of what we are doing with the Pakistanis, I will start from noting the fact that the situation seems to be somewhat different today than it has been in times past. The Prime Minister Bhutto has made a very clear statement quite different from that of her father in terms of saying that Pakistan will not acquire nuclear weapons. We have had the beginnings of some positive steps in the subcontinent in the sense of the agreement not to attack each other's nuclear facilities.

It does seem that Prime Minister Bhutto is establishing careful civilian control where the program is concerned. Developments in Afghanistan may lend themselves to a more positive situation in the area, and so that in that sense, in that sense we may have a better context for cooperation and regional cooperation than we have had in the past.

At the same time, from our end, Senator, I can assure you there will be no lack of vigor in pursuing the concerns that we have with the Pakistanis. It is our feeling that the broad relationship, security relationship that we have with the Pakistanis, including security assistance, is an important dimension in our ability, in our connection and influence with that Government and people.

Chairman GLENN. My time is up. I know these policies are very tough to work, and I know we have other interests with Pakistan. We certainly have other interests with regard to Israel, and we overlook that and continue aid. We overlook things in a lot of countries. We have F-16s to Pakistan and Israel. We have Air Force assistance to Brazil's space program. We have a whole host of things that we overlook when these matters come up then about what kind of assistance we are going to give to these various countries, and I think if we are ever going to have a chance of having nuclear proliferation, being able to really cut back on nuclear proliferation, we just have to have a policy that has been much tougher than it has been to date. Thank you. Senator Lieberman.

Let me just add that Senator Lieberman comes with an expertise. He may be a new Senator here, but he comes with an expertise in this field of long years of study back many years ago when he wrote a book, "Scorpion and the Tarantula," which I am in the middle of reading right now. It gives the historical context of early days of nuclear competition way, way back when attempts were being made to internationalize things nuclear and where that did not work out. The book is an excellent book on all the players and the efforts that went on back in those days so he comes with that kind of interest from way back, although he is a new Senator, and we welcome that kind of expertise on this Committee.

Senator LIEBERMAN. Thank you, Mr. Chairman. I appreciate your kind words and——

Chairman GLENN. Buy the book. [Laughter.]

Senator LIEBERMAN. I was just about to say that you are one of a very small number of Americans who is reading that book or ever has read it. [Laughter.]

I did have that opportunity to do that study, which concerns the period right after the Second World War when the United States and the Soviet Union negotiated, unsuccessfully of course, to stop the spread of nuclear weapons. What was clear then was that the other tensions and suspicions that existed between the two great powers stopped them from seeing nuclear weapons as something extraordinary that they ought to try to control. Maybe we are closer to that point today, at least with regard to those two nations.

That is what is so damn frustrating about this conversation. Just as we come to a point where the political interests of the two great powers may be coinciding, we face the spread of nuclear missile technology that ultimately may make the world more dangerous even as the two great powers attempt to make it safer. But I thank you for those kind words, Mr. Chairman.

I want to come back to the question of the demarches. I must mention to you that earlier this month Richard Perle was before us. He has a somewhat negative view of demarches in this area, as you may know. He referred to them as "demarche-mallows," not thinking that they are particularly effective. I take it that you do

not agree with that assessment? Do you think the demarches have had some effect as part of an American control policy?

Ambassador BARTHOLOMEW. I do, Senator. I do not think that it is a lack of forcefulness or a lack of political leverage in these demarches, the use of political leverage in these demarches that is at the root of any difficulty that we might have had in getting follow-through. But that said, I am willing to say to looking forward from the future to say that we do have to make sure that we are doing them as vigorously as possible, particularly in terms of follow-up. But I think my good friend Richard Perle has a way with phrases, and this one is not as accurate as some of his others might have been.

Senator LIEBERMAN. Okay. Let me ask you this. Do the demarches come the other way in this area? Are we being notified by foreign governments of what they take to be inappropriate transfer of technology by American firms in these sensitive areas?

Ambassador BARTHOLOMEW. I think that is rare. I do not say that it never happens. I think the consensus is that my word "rare" is overstated.

Senator LIEBERMAN. Right. What is your——

Ambassador BARTHOLOMEW. That it does. That it does happen. We do get.

Senator LIEBERMAN. Frequently?

Ambassador BARTHOLOMEW. It is not an unusual thing for us to get a demarche from a foreign Government in terms of our own applications of export controls or observance of various rules. Demarches in the sense of asking questions, demarches perhaps in the sense, I do not know, of is that the correct interpretation and the like?

Senator LIEBERMAN. And what do we then do with those? What is our reaction? What is our operating policy?

Ambassador BARTHOLOMEW. We address the problem and we will move off the mark in the sense of it. And if we think, and we will give the Government our own view. If we think they are right, we fix it.

Chairman GLENN. Is not Congress supposed to be fully and currently informed on those demarches?

Ambassador BARTHOLOMEW. With all due respect, Senator, this is an area, as you can see, of very intensive activity particularly if we put together chemical, missile and nuclear. We have a system set up whereby under Section 601 of the 1978 law, which Mr. Chairman, for obvious reasons, you know better than I, under the Section 601, we file written reports which are quite extensive. I have reviewed them. Under Section 602 we offer at periodic intervals, quite restricted briefings including to you, Mr. Chairman, and the ranking minority member of this Committee. As a matter of fact, we are seeking to give you a briefing even as we speak on it.

In that context, I think, in the second context, I think we can talk about some of these. But we are talking about a range of diplomatic, normal, almost day by day diplomatic activity is what we are talking about when we speak of these demarches, Senator.

Senator LIEBERMAN. If I may just pursue that and ask you to be a little more detailed about what we do when we receive a demarche from a foreign Government claiming that some company in

the United States is transferring sensitive technology. Do we pull their export licenses? Have we ever gone, for instance, to the extent of prosecuting anybody as a result of a demarche?

Ambassador BARTHOLOMEW. Senator, it is becoming clearer and clearer to me that there is some confusion about the meaning of a demarche. In strict technical diplomatic parlance, until somebody tells me differently, I believe it means when you approach another Government with the request that it do something or cease doing something, whatever it is. I am not talking about non-proliferation necessarily. What seems to be the case is we have a tendency, and we have been doing that today, to use a demarche virtually to be synonymous with contact.

For example, the note that I was just handed said sort of the demarche in the sense in which it has been used at times as the mechanism for information exchange, not necessarily an expression of consideration or a proposal to be made or the like. I think we need to find another word. So when I said to you, do we get a lot of contacts, yes, we get a great number of contacts. A lot of them are information exchange as opposed to the kind of sort of questioning about are you doing, are you complying and the like?

Senator LIEBERMAN. Yes, I understand.

Ambassador BARTHOLOMEW. All right. Okay.

Senator LIEBERMAN. I do not want to quibble about the numbers. What I am really asking you is this: Leaving aside the diplomatic terminology of demarche, I assume part of what you are saying is that we have received complaints from foreign Governments about American companies or the American Government contributing to the transfer of sensitive technology. And I am wondering what we do when we receive such a complaint?

Ambassador BARTHOLOMEW. I believe we have, and I am certain that immediate action is taken to examine the complaint, investigate the complaint, and to act in terms of what our rules and regulations are to correct it if we find it. This is not something we would be slow on.

Senator LIEBERMAN. Could I ask you to respond in writing to that question with some details about the volume of those complaints and how we have handled them?

Ambassador BARTHOLOMEW. We will do the best we can on it, Senator Lieberman.

Senator LIEBERMAN. I appreciate that.

[The information supplied by Ambassador Bartholomew follows:]

Other governments have from time to time approached the U.S. with information relating to a procurement attempt by a potential proliferator. These approaches, which may be as formal as a demarche, or informal exchanges of information, almost never involve items being shipped by American firms. In most cases they represent a generalized export alert, with another nation requesting that the U.S. take note of possible attempts to procure certain types of items.

There have been a few cases in which we have asked another government to deny the export of a given piece of equipment to a country of concern, where the other government has pointed out that the U.S. appears to have licensed the export of a similar item to the same country. Such instances have often turned out to involve exports of U.S. equipment which is not comparable, or which was exported under restrictive conditions on end use which we enforce through end-user checks.

Senator LIEBERMAN. If I may, I was about to ask the permission of the Chairman to go on for a moment. He is not here, so with the

permission of Senator Levin, just one last question along these lines to Ambassador Lehman. Do you think that missile and nuclear related export license applications are reaching the right agencies for review? In other words, is DOD as involved as it should be in reviewing those applications by American companies?

Ambassador LEHMAN. Senator, in all candor, the system has been less than perfect, but I do not think you can single out any agency as either being particularly guilty or being particularly innocent. Everyone of us has dropped the ball at one point or another. But I think what that highlights is that a high priority for the new Administration is to make this system work to get everybody involved. Obviously, for example, there are a wide range of commercial licensing activities that the Commerce Department deals with everyday.

They are not required necessarily to ask us whether we concur in their judgment as to whether or not certain types of licenses require interagency review. We had in the Defense Department, when I was there, tried to work out an informal arrangement whereby we would get a one-line list of export license applications so that at least we would have a heads up that during a certain period those licenses were under consideration by the Commerce Department and we could take a look and say, well, why is not this one being given interagency review.

Let me say also that when I was in the Defense Department, I took a very strong stand that the Defense Department ought to be included in these considerations, and then I turned around and discovered that we were ourselves guilty in some cases of not coordinating carefully even within our own building certain cooperative programs. So among the things that are underway for Secretary Cheney is an attempt to look at this issue and see how DOD remedies it within one of its departments.

Senator LIEBERMAN. My question was not aimed at asking you to point fingers at any particular agency, but is it correct for me to infer that the whole process by which the Government reviews these applications for export licenses is under review now?

Ambassador LEHMAN. Well, in fact, some changes have already taken place. For example, the PCC that Ambassador Bartholomew will chair will be designed to help us address many of these issues, at least with respect to the question of the proliferations.

Senator LIEBERMAN. Okay. Thank you.

Senator LEVIN. Just a couple of additional questions. First the Chairman, I believe, raised the question relative to the certification on Pakistani possession of nuclear devices. Could you give us a definition as to what the word "possession" means and your understanding relative to that certification?

Ambassador LEHMAN. Possession for us, I believe, means the physical existence of that fabricated material.

Ambassador BARTHOLOMEW. Senator, let us give you an answer to that because I think it is something that I am not certain of here in terms of it, and we need to get it precise.

Senator LEVIN. Okay. If you could submit that for the record, it would be good.

[Information supplied by Ambassador Bartholomew follows:]

Section 620E(e) conditions the continuation of major forms of assistance to Pakistan upon an annual Presidential certification in writing "that Pakistan does not possess a nuclear explosive device and that the proposed United States assistance program will reduce significantly the risk that Pakistan will possess a nuclear explosive device." Administration of this provision has been expressly reserved by Executive Order to the President. It is therefore incumbent upon the President each year to review all the pertinent facts available to the United States and to make his best judgment as to whether the conditions for certification are met. President Reagan did so four times, certifying under Section 620E(e) on November 25, 1985, October 27, 1986, December 17, 1987 and November 18, 1988. The Congress is briefed on the status of Pakistan's nuclear program as it relates to the certification through annual classified reports submitted pursuant to Section 735 of the International Security and Development Cooperation Act of 1981 and briefings pursuant to Section 602 of the Nuclear Non-Proliferation Act of 1978.

In assessing the question of "possession" under Section 620E(e), two considerations are key, recognizing that it is the President who must make any ultimate judgment. First, the statutory standard is whether Pakistan possesses a nuclear explosive device, not whether Pakistan is attempting to develop or has developed various relevant capacities. Formulations that would have required certification of the absence of activities relevant for the development of a nuclear explosive device were rejected by the Congress in favor of the current statutory language requiring certification of non-possession. A distinction must therefore be drawn between the ability to achieve possession of a nuclear explosive device, and actual possession of such a device.

Second, a state may possess a nuclear explosive device, and yet maintain it in an unassembled form for safety reasons or to maintain effective command and control over its use or for other purposes. The fact that a state does not have an assembled device would not, therefore, necessarily mean that it does not possess a device under the statutory standard. A judgment concerning possession can only be made upon an evaluation of all relevant facts and circumstances of a particular case.

Senator LEVIN. Has anyone asked either of you or perhaps Judge Webster about the possession by Iraq of nuclear devices now? Can you tell us anything about that as to whether they are seeking again to obtain that capability?

Ambassador LEHMAN. I believe Judge Webster said that he would try to answer that question either in closed session or for the record. As you know, there is a history with Iraq, and it is always a matter of concern.

Senator LEVIN. Is there anything you can say in public about whether Iraq is seeking that capability?

Ambassador LEHMAN. I am not sure that there is.

Ambassador BARTHOLOMEW. I do not think that I would add anything to that, Senator.

Senator LEVIN. That there is nothing you can say or there is nothing that we know?

Ambassador BARTHOLOMEW. Well, we could say that from the data that has been given to me that their programs, the Iraq program is not very advanced. It is a party to the NPT. The fissile material it has is under international safeguards. We are talking about Iraq now, and it is inspected regularly. And I think that even if a decision were made by Iraq to seek a nuclear weapons capability, Iraq does not appear to be at a stage where it could realistically hope to assemble a device anytime soon. But I do not think we can go beyond that in open session.

Senator LEVIN. My recollection is that there have been a number of bills introduced which would provide for sanctions against foreign firms which violate our arms export control act, or similar acts in their own countries. I believe Senator Dole has introduced a

bill to that effect, and there are other bills as well that are pending. Has the Administration taken a position on those bills?

Ambassador LEHMAN. We have taken a position with respect to the question of chemical weapons proliferation and sanctions. And we have said that provided we can work out the appropriate flexibility and ensure that they remain consistent with Executive Branch prerogatives we would work with the Congress on such legislation. We have not taken such a position yet on some of the other bills that have been introduced. As I said in my opening remarks, there are many similarities in these problems, but there are also some specific differences. So it is under review now.

Senator LEVIN. When will that review be completed?

Ambassador LEHMAN. I do not think that I can put a date on it, but the initial overall review of the proliferation problem should not take too long, a couple of months maybe. But let me say that obviously legislation works on its own time frame, and sometime we simply have to answer the mail, and so I would not preclude an answer to the question that you have raised earlier than that.

Senator LEVIN. Thank you both, and we will stand adjourned.

Ambassador BARTHOLOMEW. Thank you.

Ambassador LEHMAN. Thank you.

[Whereupon, at 12:35 p.m., the Committee adjourned.]

APPENDIX

STATEMENT BY

AMBASSADOR RONALD F. LEHMAN II

DIRECTOR

U.S. ARMS CONTROL AND DISARMAMENT AGENCY

Mr. Chairman, Members of the Committee:

I welcome the opportunity to testify before your Committee. This is not my first appearance before your Committee, I testified on nuclear non-proliferation in 1983 in another capacity. However, this is my first appearance before Congress as Director of the Arms Control and Disarmament Agency, and it is appropriate that I should again be addressing problems of weapons proliferation. The Senate Governmental Affairs Committee has played a major role over the years with respect to non-proliferation issues, particularly nuclear non-proliferation and President Bush has asked me in his new Administration to apply greater energy and innovation to these difficult problems. I pledge my Agency's full cooperation with this Committee and with others in the Congress who are focusing on nuclear and missile proliferation issues.

Even as the United States and the Soviet Union seek to stabilize East-West relations and to cooperate where possible in dealing with troublespots around the world, the threat of nuclear weapon and missile proliferation continues to grow, bringing increased instability to regions of tension. For example, should conflict erupt in the Middle East, the

possibility exists that the weapons systems available could include missiles armed with chemical or potentially even nuclear warheads. The desperation shown in the Iran-Iraq war suggests that whatever weapons systems are available might well be used. In South Asia, India and Pakistan have been seeking some nuclear-weapons capacity and ballistic missiles. Elsewhere, the unsafeguarded nuclear programs of Argentina, Brazil, and South Africa are sources of continuing concern.

The proliferation of nuclear weapons and missile delivery systems would inevitably threaten regional security and upset local balances of power, complicate US forward deployments and challenge our ability to assist allies and friends during a conflict, and perhaps increase the likelihood of superpower intervention or involvement. The proliferation of nuclear weapons or missile delivery systems inevitably promotes increasingly sophisticated arms races throughout the Third World and increases the risk of use. The actual use of nuclear weapons would likely cause massive loss of life and could destroy the current structure of global security.

The nuclear and missile proliferation threats share some similarities:

-- countries that pursue one capability often are also pursuing the other as well;

-- there is a general consensus between Western industrialized countries and the Socialist bloc that efforts to tackle proliferation are worthwhile; and

-- some of the same policy tools are generally applicable to trying to arrest both.

Notwithstanding these similarities, however, there are major differences between these forms of proliferation. Examples of these differences include the nature and availability of the material and technology required; the existence of international institutions to deal with them; and the potential for effective export controls and international safeguards.

NUCLEAR NON-PROLIFERATION

The US has long displayed strong international leadership in efforts to prevent the spread of nuclear weapons. As a result, nuclear non-proliferation policy tools are more developed than those for missiles. The backbone of the nuclear non-proliferation effort consists of four components; namely treaties, safeguards, export controls and bilateral efforts.

In the area of nuclear non-proliferation, treaties play a central role, particularly in setting basic standards. The Treaty on the Non-Proliferation of Nuclear Weapons, the NPT, now has 139 parties and has, by itself, become a significant barrier to nuclear proliferation. Regional efforts are also important and, in this regard, I would cite the Treaty for the Prohibition of Nuclear Weapons in Latin America, the Treaty of Tlatelolco. This regional treaty provides the best hope for maintaining a Latin America free of nuclear weapons. The United States is party to the two additional protocols to the Tlatelolco Treaty.

The US must reinforce and reinvigorate both the NPT and the Treaty of Tlatelolco. We have just concluded an international meeting in Mexico City on the Treaty of Tlatelolco. The US Delegation was led by the Acting Director of ACDA. We are working now to assure a successful outcome of the 1990 NPT Review Conference and to explore approaches in other regions aimed at reducing nuclear proliferation risks.

International safeguards, implemented by the International Atomic Energy Agency, are designed to ensure that facilities and materials subject to IAEA inspection are not used for nuclear weapons. The US must continue to exercise strong leadership in promoting intrusive safeguards to ensure the

maintenance of one of the most effective treaty verification schemes in existence. President Bush, recognizing the value of the Agency in his State of the Union address, committed himself to "strengthen the hand of the International Atomic Energy Agency."

Internationally agreed export controls, in particular those implemented through the Nuclear Suppliers Group (London Club) and the NPT Exporters Committee (the Zangger Committee), are fundamental to nuclear non-proliferation efforts. Because production of weapons-usable nuclear material is a complex task, export controls on production technology have been effective in slowing nuclear proliferation. However, worldwide industrialization, procurement strategies of potential proliferant countries, and the emergence of new nuclear suppliers not parties to the NPT pose continuing challenges to the effectiveness of export controls. While the efforts of the London Club and the NPT Exporters Committee must be continued and even enhanced, we must also find ways to encourage new nuclear suppliers, particularly those in the Third World, to adopt effective controls on their nuclear-related exports.

Bilateral discussions among interested states to express concerns, share information, and develop common vision help create barriers to nuclear proliferation. Such discussions

focus on significant nuclear-supplier countries and other key nations supporting non-proliferation. Discussions with non-NPT nations also help in the search for ways to reduce proliferation risks.

MISSILE PROLIFERATION

It is true that a nuclear weapon once acquired can be delivered by a variety of means ranging from trucks to cargo aircraft to missiles. Delivery of such a weapon by a ballistic missile is of particular concern, because once launched it cannot be recalled, it travels with great speed, and may give undue confidence to a potential aggressor. Possession of nuclear-armed missiles by additional countries would create a grave threat to international security given the level of international tension that exists in some regions, the limitations on command and control, and the proximity of the antagonists.

However, many of the tools for nuclear non-proliferation are not available for missile proliferation.

There are no multilateral treaties applicable to the prevention of missile proliferation. The Missile Technology Control Regime (MTCR) is an export control regime coordinated

with our Economic Summit partners. The controls established in the MTCR apply to all unmanned delivery systems capable of carrying a payload of at least 500 kilograms to a distance of 300 kilometers or more. All agree that we must seek to strengthen the MTCR and broaden participation in this regime. We also need to continue to search for wider agreement on limiting the spread of missiles.

With respect to safeguards, there are no institutions or treaties upon which safeguards could be based. To date, the small amount of research that has been done in this area has not demonstrated the efficacy of safeguards.

Export controls relating to missile proliferation presently consist of procedures under the MTCR. MTCR controls have had a positive impact on controlling proliferation. As with any relatively new regime, there are some differences with respect to interpretation and implementation, but these are being addressed. I am confident we can improve the effectiveness of the regime.

Missile-related technologies are more widely available than nuclear technologies, so export controls for missiles may not be as successful as they have been for nuclear proliferation. Additionally, space launch and meteorological rocket programs could support missile development programs, either as a "cover" or as a part of a technology acquisition process.

Bilateral discussions devoted to missile proliferation have been held, but they have not yet become routine. Those that have been held have been marked by fair success. A good example is our bilateral discussions with China. We believe that the Chinese now understand our concerns, and we hope that they will show restraint in transfers of missiles and related technology. With respect to the Soviet Union, I can inform you that during Secretary Baker's recent discussions in Moscow agreement was reached to intensify our dialogue with them on missile proliferation.

ACDA's Role

After only a few days on the job, I have not completed my review of ACDA's resources and activities devoted to nuclear and ballistic missile proliferation. Nor have I made any decisions related to internal organization. However, I would offer a few observations.

On nuclear non-proliferation, ACDA is the lead agency in managing US involvement in the NPT, particularly preparations

for and participation in NPT Review Conferences. Substantial effort has already been undertaken in connection with the 1990 Conference. ACDA has long been a major resource for US efforts to strengthen the IAEA's safeguards system. ACDA has also played a key role in interagency nuclear export control efforts, both national and international. This activity includes implementation of multilateral nuclear export control guidelines, preparation of demarches on individual cases, and monitoring procurement efforts by potential proliferants in the US.

With respect to missile non-proliferation efforts, ACDA has been actively involved since 1981 when the Agency first called interagency attention to attempts that were being made to purchase US-origin missile components on a part-by-part basis. ACDA actively participates in the diplomatic aspects of our missile non-proliferation efforts ranging from reviewing missile related export cases to participating in the interagency policy process at all levels. ACDA brings to bear military, intelligence, regional and diplomatic experience relevant to missile non-proliferation. Our extensive involvement in nuclear non-proliferation provides a wealth of knowledge and experience that is often useful in approaching missile non-proliferation issues.

ACDA will participate fully in the development of policy during the Administration's review of non-proliferation issues, and will bring to bear all the energy and innovation which leadership and teamwork can provide within existing resources. As the new Director of ACDA in a new Administration, I assure you that I will take advantage of the on-going review of ACDA's resources and organization to make improvements wherever I find it necessary.

STATEMENT OF THE HON. REGINALD BARTHOLOMEW, UNDER SECRETARY OF STATE FOR SECURITY ASSISTANCE, SCIENCE AND TECHNOLOGY

BEFORE THE SENATE GOVERNMENTAL AFFAIRS COMMITTEE HEARING ON NUCLEAR AND MISSILE PROLIFERATION

May 18, 1989

Introductory Remarks

Mr. Chairman and members of the Committee. I welcome this opportunity to appear before you today to discuss the Bush Administration's nonproliferation policy. The United States has long had a bipartisan commitment to stop the spread of nuclear weapons. On a number of occasions, both during his campaign and in the first months of his Administration, President Bush has reaffirmed this commitment. The President has also noted the new and increasing global threat of the spread of chemical/biological weapons and missiles. He has pledged that his Administration will work to combat the dangers posed by the proliferation of all of these advanced weapons.

In my prepared testimony, I would like to draw some general comparisons and distinctions between nuclear, chemical and missile proliferation and then address some of the specific problems and challenges for the future. We are currently reviewing our nonproliferation policies and these remarks are therefore preliminary, pending the outcome of this review.

The different types of proliferation, including nuclear, chemical and missile tecnnology, have fundamental similarities: First, the scientific and technical knowledge

required to develop these weapons is widely available, and equipment and materials can be obtained (with various degrees of difficulty) by a determined government willing to dedicate sufficient manpower and resources.

Second, in many countries, the motivation to acquire such weapons stems from real or perceived security concerns. Therefore, reducing political or security incentives for proliferation is critical to resolving these problems.

Third, these technologies often have legitimate commercial uses that make controls or total bans difficult.

Finally, many of the tools available to prevent proliferation -- agreed international norms and institutions, security assistance, export controls, verification regimes -- can be applied to more than one type of technology.

Proliferant technologies also have major differences. The first and most obvious distinction is that some technologies are used to develop weapons of mass destruction, while others are used for ancillary capabilities such as delivery systems.

Second, the technical complexity, cost and availability of key materials (fissile nuclear material, chemical precursors, missile propulsion/guidance/control equipment and fuels) are quite different in degree in each case.

Third, the potential for effective export controls on key commodities and information, as well as for international verification, varies widely among different types of technologies and within each type, as well as among countries.

Finally, in the nuclear area, international institutions and procedures have been extensively elaborated and our task is to maintain and strengthen that regime. In the chemical area, there are international prohibitions against the use of these weapons and active negotiations to achieve a global ban. Our other efforts to control their proliferation, while progressing, are still in the early stages. In the missile area, our international efforts are just beginning and our task is to build an effective network of institutions and controls.

Proliferation of any of these weapons technologies would pose a serious threat to U.S. national security. Simultaneous proliferation of nuclear and chemical weapons and the capacity to deliver them with missiles adds a new dimension to that threat. The combination of missiles and these warheads in certain regions would inflame tensions and arms races, threaten to involve the superpowers in local conflicts involving key allies, and complicate our ability to project force to defend our interests.

Proliferation is not just America's problem. The risk confronts all countries. The United States is fully committed to exerting its traditional leadership role in this area. But U.S. efforts are not a substitute for the active involvement of other countries. We will cooperate fully with our allies, friends and any other countries willing to play a constructive role, but the entire burden of leadership does not rest with

the United States. We will continue to communicate this message to the highest levels of governments in other countries so that they will view the problem with a similar sense of urgency.

We would also hope that proliferant countries will recognize that trying to achieve greater security through proliferation is an illusion. Proliferation breeds proliferation, and increases the danger to everyone. The solution will not be found in grandiose schemes for universal disarmament, but in serious talks with one's neighbors and concrete measures to reduce tensions, build mutual confidence, and promote stability.

I would now like to discuss some specific nonproliferation issues, turning first to the nuclear area. I would like to touch briefly on a few themes and problems that I believe will pose the most serious challenges for U.S. nonproliferation policy over the next several years.

Nuclear Proliferation

Institutions

As I suggested a few moments ago, the nuclear nonproliferation regime has a highly developed and articulated system of institutions and controls. The legal and institutional framework is well known. It includes the Nuclear Non-Proliferation Treaty (NPT); the Treaty for the Prohibition

of Nuclear Weapons in Latin America (Treaty of Tlatelolco); the International Atomic Energy Agency with its vital system of international safeguards and its program of technical assistance for peaceful nuclear development; the agreed norms for approving nuclear exports embodied in the Nuclear Supplier Group Guidelines and the NPT Exporter's Committee Guidelines; and an intricate web of bilateral and multilateral agreements for peaceful nuclear cooperation establishing conditions and controls for nuclear commerce, as well as national export control and national non-proliferation legislation.

We must continue to work to strengthen these institutions including:

-- Increase the number of adherents to the NPT and work toward a successful Review Conference in 1990 and 1995;

-- Continue support for the IAEA while resisting attempts to politicize that institution;

-- Improve international export controls, including discussions with emerging suppliers such as Brazil and Argentina; and,

-- Continue ongoing bilateral consultations with key countries including the Soviet Union and the United Kingdom.

Problem Regions

Beyond maintaining and improving the regime, we must deal with specific problems that are outside its parameters. In my

judgment, South Asia remains the region of greatest concern from a nuclear proliferation standpoint. The immediate problem is to persuade both India and Pakistan to observe restraint in their nuclear activities so that tecnnical developments do not overtake the chances for diplomatic progress.

The elections last year in Pakistan and the resolution of the Afghanistan conflict may open new opportunities for better relations between India and Pakistan, including the beginning of a serious dialogue on ways to reduce tensions. Their recent agreement to abstain from attacks on each other's nuclear facilities was a step forward. We hope it will pave the way for further measures to remove the threat of nuclear proliferation on the subcontinent.

At the same time, other regions warrant careful monitoring. The Middle East is an area of severe tensions where chemical and missile proliferation is already occurring. We will need to follow developments closely to prevent nuclear proliferation. Also, we continue to urge Israel to adhere to the NPT or to otherwise accept IAEA safeguards on all its nuclear activities.

In Asia, we are mindful of the need to prevent any movement away from the peaceful uses of nuclear energy. We continue to work with others to ensure that North Korea concludes its NPT safeguards agreement with the IAEA promptly.

In Latin America, we see some possibility of progress. Argentina has made some serious overtures to Brazil on developing a regional peaceful nuclear relationship. We should continue to encourage these countries to develop political commitments and safeguard arrangements to preclude the spread of nuclear weapons to Latin America.

We are actively working with the two other NPT depository states, the United Kingdom and the Soviet Union, to encourage South Africa to adhere to the Non-Proliferation Treaty.

Peaceful Nuclear Cooperation

One of the central elements of the Non-Proliferation Treaty is that non-nuclear weapons states, in return for forswearing acquisition and development of nuclear weapons or other nuclear explosive devices, have the right to participate in the fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy. The United States takes very seriously its obligation under the Treaty to facilitate peaceful nuclear cooperation under adequate safeguards and controls. This not only supports the basic bargain underlying the NPT, but also permits us to exercise influence and leverage with our cooperating partners in nonproliferation matters. Therefore, it is very important that the United States preserve its credibility as a dependable partner in peaceful nuclear cooperation under effective nonproliferation controls and international safeguards.

Missile Proliferation

Our efforts to curb the spread of nuclear weapons date back some forty years. In contrast, missile proliferation is a more recent problem. Because these delivery vehicles are fast flying and difficult to detect and counter in flight, they pose the threat of surprise attack. Their presence in politically tense regions can be destabilizing, increase tensions and encourage countries to put their military forces on hair-trigger postures.

Just as we confronted the possibility of large-scale nuclear proliferation in the early 1960's, we confront the same problem today with missiles. By the end of this century, up to 20 countries may have missiles and many could be armed with chemical/biological or nuclear warheads. A large number of these countries are located in regions, such as the Middle East, where political tensions are high and the potential for conflict is great.

The political, military and technical trends which have encouraged the spread of missiles are relatively clear. First, the know-how to build missiles has become widespread through the growth of export oriented defense industries in industrialized countries and the growth of indigenous industries in the developing world.

Second, there has been a growing demand among developing countries for missiles, to deal with perceived security

threats, enhance national prestige and to foster economic development.

Third, many industrial states have strong incentives to assist other countries in acquiring missiles and the capability to build them. These interests include enhanced political influence, hard currency earnings, and support for key domestic industries. Moreover, little of the international indignation which would accompany the transfer of nuclear or chemical weapons has accompanied the transfer of missiles or related technologies.

However, the proliferation of missiles is by no means inevitable. Building a missile is exceedingly difficult, even with foreign assistance. Also, missiles are expensive to buy, build or maintain. For many countries with economic problems, this cost can be prohibitive. Moreover, missile programs may not be a top national priority. The broad support required to enter production may not be present, particularly if there are competing priorities, high costs, and technical problems. Finally, international awareness about the dangers of missile proliferation, especially in key supplier countries, is growing.

We recognize both the potential for missile proliferation, and the realities working in our favor. U.S. policy, in concert with other concerned countries, must be designed to increase the political, economic, and diplomatic costs associated with buying, building or selling these weapons. The goals of our effort are to:

-- deny the sale or acquisition of missiles;

-- delay acquisition by increasing the time and resources needed to develop or buy missiles;

-- increase international pressure which will assist our efforts to curb proliferation; and

-- limit potential damage to our policy or interests where missile acquisition can not be prevented or delayed.

We have an established international regime for nuclear nonproliferation. For missiles, however, our efforts have just begun. Under President Reagan, the U.S. helped establish the Missile Technology Control Regime (MTCR), an export control arrangement which includes the Group of Seven countries, the United Kingdom, France, West Germany, Italy, Canada, Japan and ourselves. The Reagan Administration also pursued other approaches including discussions with key suppliers outside the MTCR, the USSR, the the People's Republic of China, emerging suppliers such as Argentina and Brazil, and key countries in the Middle East and South Asia.

A great deal of work remains. We are now examining several key issues and options. Some of these are sketched out below.

o The first cnallenge we face is how to improve multilateral efforts to curb missile proliferation. Our policy has focused on the MTCR which seeks to control the export of missiles and related technologies. The MTCR has had a substantial impact on some developing programs which rely

heavily on the import of foreign technology. For example, the Argentine/Egyptian/Iraqi Condor II missile is far behind schedule due, in part, to the MTCR. But the regime also suffers from a number of problems.

First, multilateral export control policies are complex and differences in national laws, regulations, policies and interpretations can limit their effectiveness. Such differences arise in the case of the MTCR.

Second, the regime's members currently include only the Group of Seven industrialized countries. Some important suppliers are not members and therefore the potential for undercutting the regime is great.

Third, several countries seeking missile capabilities are relatively advanced in technological areas key to missile design and construction. They have a relatively independent technological capability to construct large rockets. In such cases, export control regimes have limited effectiveness.

Finally, as currently structured the regime has no incentives for developing countries seeking to either buy or build missiles to abandon their activities.

We plan to work closely with our MTCR partners to resolve differences in interpretation over the regime's controls, to tighten the MTCR export controls, and to expand membership, particularly to other members of the European Community.

We must also examine other multilateral options which include all countries, industrialized and developing. Whether future approaches will be based on universal adherence, incentives for developing countries, or some other formula remains to be decided.

o A second key issue is how to secure the cooperation of the Soviet Union and the PRC. Both countries are key players in curbing missile proliferation because of their diplomatic influence and status as major suppliers of missiles and technology. We have held discussions with the Soviets on missile proliferation, including at the recent Moscow ministerial where we proposed to share assessments of the problem on a fully reciprocal basis and agreed to work on a common approach. With regard to China, in nearly all our high level contacts in 1988 and 1989, we have stressed the dangers of missile proliferation and sought Chinese restraint. The Chinese have been responsive to our concerns and we will continue to raise this issue in our dialogue with them.

The Bush Administration intends to pay greater attention to involving these key countries in our nonproliferation efforts. We are still considering whether the most fruitful approach would be to focus on bilateral discussions, to work towards their membership in the MTCR, or to seek some other international arrangement in which they would participate.

o Third, we need to further examine the possible benefits of a regional component in stopping missile proliferation. Just as with nuclear proliferation, curbing the spread, particularly the demand for missiles, may require regional approaches to complement our other efforts. We have taken preliminary steps in the Middle East and South Asia, where the danger of missile, nuclear, and chemical/biological proliferation poses the greatest threat to international stability.

We need to promote a dialogue on missile proliferation through diplomatic contacts with countries in these regions, with our MTCR partners and with other key suppliers. And, we need to study in greater detail how our efforts can help lessen tensions created by the presence of missiles and in eventually reducing the threat posed by these weapons.

o Finally, more consideration needs to be given to the role of security assistance in curbing missile proliferation. Just as with nuclear proliferation, there may be an important role for security assistance in our missile nonproliferation policy. Such assistance can help dissuade countries from acquiring or building missiles and help our friends cope with the threat of missile attack.

Conclusion

In closing, I would like to reemphasize that nuclear and missile nonproliferation are important priorities for the Bush Administration. Our immediate tasks differ in both: to maintain and strengthen the well established international nonproliferation regime for nuclear explosives, and to better enforce and expand the still evolving regime for missiles. However, our goals are the same, namely to curb the spread of these advanced technologies. Dealing effectively with these problems will require a bipartisan approach. I stand ready to work closely with Congress to acnieve this important goal.

NUCLEAR AND MISSILE PROLIFERATION

● Mr. GLENN. Mr. President, I have spoken many times about the global spread of nuclear weapons and missiles, and about the measures that are needed to halt this proliferation before it sends the world into turmoil. If anyone here seriously thinks that these problems are now under effective control—or that the threats from the proliferation of these weapons are remote from the daily lives of average Americans—then I have a few comments that may change your mind.

A VOICE OF REASON

Let us start with some common sense—you do not need a top secret intelligence clearance to understand how the proliferation of these deadly weapons threatens us all. As much as I have read and spoken about this problem, I have not seen a more straightforward statement of the risks and responsibilities that we face as a nation in this area than a brief opinion piece by A.M. Rosenthal that appeared in last Friday's New York Times.

Mr. President, I ask to submit at this point in the RECORD an op-ed by A.M. Rosenthal, from the New York Times of May 12, 1989.

The article follows:

THE WEAPONS OF HELL

At least we will know where to put the blame. If the day comes when the terrorist nations use the weapons of hell against us or other enemies, at least we will know that.

At first, we will try to evade the truth. We will say it is the fault of our friends and allies who sold those mad-men the material for the chemical weapons, the missiles and the nuclear technology.

But eventually we will have to face reality: the blame belongs to us, the Government and people of the United States. We knew, and could have stopped it, but did not.

About 40 West German companies are suspected by Washington of shipping chemicals and technology for chemical warfare to a Libyan plant and other Middle Eastern countries. German companies helped Libya, Syria, Iraq and possibly Iran build missile capability.

China is sending missiles to Libya. A Swiss company negotiated with Iran to build a poison gas plant.

We know Pakistan, and probably India too, has received clandestine help from abroad in preparing its nuclear weapons capability. Pakiston is an American ally and India a democracy important to us.

But perhaps someday far less friendly regimes will rule in Islamabad or New Delhi. Then we would live in fear that nuclear weapons capability could be transferred to bitterly hostile nations.

The principal target for the chemical weapons—the Libyan plant alone will produce 40 tons a day for warfare—of course would be Israel.

But the terrorist nations showed, during the Iran-Iraq war, that they will use chemical weapons against each other and their own people.

So it is easily conceivable that countries that deliberately blow up civilian airliners might one day raise the terror level by planting and exploding a chemical weapon somewhere in the West. The Ayatollah would regard it an act of special piety.

Americans look on drowsily. Is the danger on another planet? American specialists on terrorism and weaponry are astonished at the public passivity.

American Governments have not provided leadership. The Reagan Administration sent more than 250 polite complaints to the West Germans about nuclear aid to Pakistan and chemicals to Middle Eastern countries.

But the protests were usually secret. Our German allies either buried or routinely denied them.

Now, that Swiss company finally agrees that helping Iran build a poison gas plant would not be a delicate thing to do.

The West Germans got around to arresting the former director of the company that built the Libyan plant—the same company that, in January, Bonn indignantly denied was doing anything of the sort.

Well, that's nice. But all those other complaints Washington made to Germany, what happened to them and how were investigations carried out?

But it is not useful to blame the Germans or Swiss or Chinese. Obviously they do not consider selling chemical weapons or missiles to terrorist nations that bad; matter of values.

It is this country's job and moral obligation to stop friends and allies from sending terror weapons to terrorists.

First, the Government must stop wrapping the record in secrecy, stop putting "classified" stamps on our protests, stop covering evasions and denials. The "secrets" are kept not from suppliers or receivers—just the American public. President Bush can end that with a telephone call to the State Department.

Then we should cut off from the U.S. market every foreign company we believe is sending materials or technology for these weapons to terrorists; cut them off very fast, for very long.

Legislation to do this is before the Senate and the House, introduced by members of both parties. The Administration wants the decisions to cut off trade left to the President. No; they should be automatic by law.

We must tell the Chinese Government that we happen to have our own little cultural sensitivities and that they must choose between missiles to Libya and business with us.

Then we must say much the same thing to our allies. Most of them are as worried as we—and as clean. As for Germany, perhaps we may find that more Germans will agree with us than with the grossly, unforgivably insensitive German companies on the list of traders in hell.

Of course, we have to make absolutely sure we are not in that trade in any way ourselves—as we and Israel were so shamefully when the missiles were sent to Iran. It is part of waking up and looking in the mirror—better now than waiting until just one day too late.

Mr. Rosenthal makes three key points:

First, since today's foreign friends may easily become tomorrow's foes—a lesson we learned the hard way in the cases of Libya and Iran—we should not directly or indirectly condone the proliferation of nuclear weapons or nuclear-capable missiles anywhere, even by our friends. It is our duty to encourage our friends to see the folly in possessing such weapons and to communicate our firm determination to stop this mad pursuit of what Mr. Rosenthal calls, the weapons of hell. We must have a global policy.

Second, the United States cannot shirk its responsibilities by covering up proliferation with the veil of secrecy based on political concerns—secrecy based on legitimate concern about intelligence sources and methods is one thing, but secrecy based on political convenience is quite another. When we send hundreds of diplomatic protests and messages to other nations that are chronic suppliers of matierals for these "weapons of hell," our responsibility does not—and cannot—stop with the delivery of these so-called demarches.

Why should the Congress and the American people not be informed if our doplomacy is ineffective in stopping this deadly commerce? Why should the citizens in the offending country never be provided an opportunity to learn of the concerns that we are expressing to their leaders? Are we using secrecy to protect the guilty, or to mask a failed policy? If so, maybe an appropriate subject for Mr. Rosenthal's next op-ed might be, the "policies of hell."

His third point is that our policies must have some teeth—when we detect illicit trafficking in commodities associated with nuclear weapons, missiles, chemical or biological weapons, we must have something more in our grab-bag of diplomatic responses than what Richard Perle has recently called, demarche-mallows. I believe Mr. Rosenthal is right: The time has come for the United States to impose stiff economic penalties on companies that chronically traffic in goods related to all of these types of weapons. We need to penalize not just the use of these weapons in war. We need to go after the "kingpins" of the illicit nuclear and missile marketplace. The world must know where we stand.

THE VOICE OF THE AMERICAN PEOPLE

Although the previous administration did very little to educate the American people about the threats we all face from the proliferation of nuclear weapons and their various delivery systems, I am convinced that the public understands that nuclear terrorism or regional wars involving these "weapons of hell" are threats that deserve a high priority in any administration.

In the early days of the last Presidential campaign, the polling firm, Marttila & Kiley, Inc., released a survey of randomly selected American voters which shows that the public at large is definitely concerned about the problem of nuclear proliferation. Here a few quotes from the findings of that survey:

Several findings point to a growing public concern that nuclear proliferation and Third World instability, perhaps even more than a continued arms race between the superpowers, represent the gravest threats to our national security.

Other than "tensions in the Persian Gulf" * * * Americans are more likely to view "the spread of nuclear weapons to the Third World" as a serious threat to our country's security than any other item we tested.

Fully 76 percent regard nuclear proliferation as an "extremely" or "very" serious threat to national security * * * this ranks higher than either the "nuclear weapons buildup by the U.S. and Soviet Union" (64 percent), or "Soviet aggression around the world" (56 percent).

More recently, the Roper Center for Public Opinion Research has reported a Yankelovich survey in which 1,000 randomly selected registered voters from across the Nation were asked to assess the extent to which "the spread of nuclear weapons to Third World countries" threatened our national security interests.

Here are the results of that October 1988 poll: An astounding 87 percent of the respondents ranked nuclear proliferation as either an "extremely serious" or a "very serious" threat. It is interesting that this figure is over 10 percent higher than the result obtained in October 1987 to the same question. Only 2 percent of the voters in the 1988 poll called the proliferation threat, "not very serious."

This, Mr. President, is the voice of the American people—this is where we stand.

THE VOICE OF THE MEDIA

In recent months, the international and domestic news media has been issuing one horror story after another about the worsening global spread of nuclear weapons, missiles, and chemical and biological weapons. I ask to submit into the RECORD at the end of my remarks the full texts of several of these reports. Here is what the media is reporting:

Pakistan continues its march toward the bomb.—The European press is having a field day with reports that Pakistan has acquired from West Germany United States-origin tritium—an H-bomb material—tritium recovery equipment, lithium—used in producing tritium—and a United States-origin laser, the latter as part of a package of equipment for making nuclear fuel. Meanwhile, the Pakistani army chief has boasted that his recently tested surface-to-surface missiles "are extremely accurate systems and can carry a payload of over 500 kg (1,100 pounds)." All of these developments are occurring in a country that receives hundreds of millions of dollars in United States economic and military aid—aid that President Reagan recently certified "will reduce significantly the risk" of Pakistan acquiring the bomb.

India's nuclear and missile programs are rolling like the ancient juggernaut.—India is now reported to be ready to test fire a 1,500 mile intermediate-range ballistic missile. It is ironic that India, after having condemned the United States and the Soviet Union for many years for failing to make progress in nuclear disarmament, is now developing a nuclear-capable missile that is within the class of delivery systems that the United States and Soviets have just agreed to

eliminate. India has also reportedly acquired United States-origin beryllium—a material used in components of United States nuclear weapons—for its nuclear program and has been openly accused by the Government of Norway as the illicit destination of over 20 tons of Norwegian heavy water, a material used in producing plutonium.

Nuclear and missile developments are of growing concern in East Asia.—China persists in its stubborn refusal to join international treaties against the proliferation of nuclear weapons, while aggressively promoting sales of ballistic missiles and missile technology to unstable regions. Admiral Thomas Brooks, the Director of U.S. Naval Intelligence, recently testified before the House Committee on Armed Services that in 1988, "the PRC began marketing its 'M' series of short range tactical missiles * * * the M-9 SRBM (325 nm range) is certain to find clients in a number of Middle Eastern/South Asian states." The Chinese are also marketing dual-use equipment and materials associated with the development of nuclear weapons. Meanwhile, I have learned that our Government is considering selling to China valuable nonnuclear parts for nuclear powerplants, worth hundreds of millions of dollars, even though United States law bars the provision of United States nuclear technology to China until certain nonproliferation conditions are met. And thanks to a recent 30-year United States/Japan nuclear agreement, Japan no longer needs United States case-by-case approvals to make use of or ship, by air or sea, ton quantities of weapon-usable plutonium produced from United States-supplied nuclear fuel or reactors. Press reports are also circulating that North Korean may be building an unsafeguarded nuclear reprocessing plant for plutonium production, and that South Korea is working on a ballistic missile that meets the standard international criteria of being "nuclear-capable." If the Korean peninsula goes nuclear, how long could Japan afford not to follow suit?

But there are other regions that are receiving their fair share of press reports in recent months:

The Middle East is on the verge of an arms race involving all of the "weapons of hell."—While Israel's nuclear weapons and long-range missile programs remain unfettered and a subject that is taboo for discussion even among Israel's own citizens, Iraq appears determined to develop its own heavy missiles, chemical and biological weapons and, according to some recent reports, nuclear arms to meet its own regional ambitions. Egypt appears determined to acquire its own IRBM with the assistance of Argentina, Iraq, and unscrupulous European arms dealers. Saudi Arabia, meanwhile, is sitting comfortably with its new Chinese nuclear-capable CSS-2 IRBM's. According to Admiral Brooks—the United States naval intelligence chief—Libya, Iraq and Iran are all, in his words, "actively pursuing" a nuclear weapons capability. Who knows who will be the next to toss a match into the Middle East tinderbox?

Projects are underway in Latin America to develop nuclear submarines and nuclear-capable missiles.—Along with continuing concerns about the refusal of both Argentina and Brazil to join international treaties banning the acquisition or proliferation of nuclear arms, a concern heightened by the dangers of political instability in each country, both nations appear determined to acquire long-range ballistic missiles and nuclear submarines. And both Argentina and Brazil appear intent to export their nuclear-capable missiles to customers in the Middle East.

THE VOICE OF THE NEW ADMINISTRATION

President Bush has stated both in the campaign and after coming to office, that he regards nuclear and missile proliferation to be among the foremost threats facing the Nation and our allies. I hope that he is able to translate his concern into tangible policies designed to halt the spread of these dangerous weapons. He will certainly have my support in pursuing this objective.

Soon the new administration will have a major choice to make. Will we continue the policies of the past, with all of their trappings—such as the demarche-mallows, the refusal to report bad news to Congress and the American people, the blindness to proliferation activities in friendly countries, and the myth that being a reliable supplier of nuclear goods and military aid will purchase responsible nonproliferation policies among recipients of those supplies? Or will we reinvigorate our policies with new ideas, fresh approaches, and a heightened sense of national commitment? I hope we are prepared to show the world that we not content with trying to manage proliferation, and that we are willing to work creatively with other nations to stop it outright.

Mr. President, as chairman of the Committee on Governmental Affairs, I would like to announce that the committee will hold a hearing on Thursday, May 18 to hear the views of the new administration on these issues. We will hear the testimony of CIA Director William Webster, Mr. Reginald Bartholomew, who has been called the "nonproliferation czar" at the State Department, and Ambassador Ronald Lehman, the new Director of the Arms Control and Disarmament Agency, to assess the threat and our national responses to these awesome challenges facing the Nation.

I hope that this hearing marks the start of a new era of cooperation and consultation between the Executive and Congress in the nonproliferation area. We are going to need this cooperation at home if we are to expect any cooperation or respect from our friends and foes abroad.

The material to be printed in the RECORD follows:

[From Nuclear Fuel, Mar. 6, 1989]

U.S. REPEATEDLY WARNED GERMANY ON NUCLEAR EXPORTS TO PAKISTAN

(By Mark Hibbs)

The U.S. government has issued about 100 specific communiques to the West German government related to planned exports to the Pakistan Atomic Energy Commission (PAEC) and its affiliated organizations, according to information obtained by NuclearFuel. Documents reveal that since the early 1970s planned exports—some of which were carried out—included a range of items—from computer technology to uranium.

Beginning in 1982, U.S. nonproliferation officials began warning Bonn that PAEC attempted to acquire technology for capture of pure tritium. In March, and again in May, 1986, the U.S. told German officials that the firm Linde AG was planning to export a tritium extraction facility to PAEC.

In responding to U.S. requests, German officials contacted Linde, which said it "had no plans" to export such a facility.

The U.S. sent a third warning in December 1986. "Notwithstanding Linde's assertions, we continue to believe that the information we provided you previously is correct, and that Linde submitted a proposal to PAEC for installation of a tritium recovery facility."

While on two previous occasions German export officials asserted that technology from Linde "could not result in a form of pure tritium," the U.S. government replied that "our technical information indicates that such a facility could result in a pure form of tritium."

Western tritium experts queried by NuclearFuel said that the U.S. position was correct. Linde AG, one of a handful of firms in the world with expertise in the field of cryogenic distillation of hydrogen isotopes, could have supplied a heavy water detritiator with capability to purify the tritium gas product.

In 1985, Germany licensed for export to Pakistan a tritium plant, by the firm NTG Nukleartechnik GmbH (NTG), preferring to call it a "heavy water purifier" instead of—as the U.S. preferred—a "tritium recovery facility" in the interests of complying with German regulations on sensitive nuclear exports. While heavy water purification technology is not subject to export controls in Germany, technology for the recovery of tritium is controlled.

The U.S. believed that Germany would control export of tritium capture technology to Pakistan according to a pledge made by German officials at a spring 1986 meeting of the Coordinating Committee on Export Controls (COCOM). While German officials previously told the U.S. they "had no authority" to control tritium technology exports, the U.S. government told Bonn that Germany "should now have the legal authority to control the export of a tritium recovery facility." Equipment especially designed for tritium production or recovery appears on Germany's Nuclear Energy List of March 25, 1988. That list of items needing an export license is an annex to Germany's Foreign Trade Ordinance.

The U.S. also discussed with Bonn reports that nuclear trader Alfred Hempel may have been working to assist PAEC is acquiring material for an unsafeguarded reactor.

According to a German government report, citing "friendly intelligence," Hempel, in late 1986, made an offer to PAEC through the firm Ventron GmbH for supplying boron carbide, an absorber mate-

rial used in reactor construction. U.S. officials told Bonn that "it is well known that Pakistan is developing an indigenous, unsafeguarded reactor" and advised export officials to intervene. In November 1987, German officials advised the U.S. embassy in Bonn that boron exports to Pakistan would require an export license and that none would be given.

Based on other intelligence information, the U.S. Arms Control and Disarmament Agency (ACDA) had requested in 1980 that the West German government investigate several dealings of Nuken GmbH with PAEC.

According to a German government report prepared at ACDA's request, Nukem officials, in 1973, were negotiating the sale of 8 metric tons (MT) of heavy water to the Pakland Corporation, which, according to intelligence sources, was a purchasing arm of PAEC. In the same year, Nukem discussed selling PAEC an undisclosed amount of uranium metal. German officials said that in 1977 the U.S. Energy Research & Development Administration, DOE's predecessor agency, approved the export by Nukem of materials testing reactor (MTR) "reprocessing and transport" technology to the unsafeguarded Pinstech reprocessing facility in Rawalpindi.

The report also says that Nukem sent 30 kilograms of UF6 of unspecified enrichment to PAEC via the Pakistan embassy in Paris in 1978. In the same year, Nukem officials negotiated delivery of "waste liquid vaporizing technology" to PAEC for New Labs, another unsafeguarded reprocessing facility, as well as melting crucibles and 145 kg of depleted uranium.

Nukem officials, according to the report, said only the UF6 was sent to Pakistan. Three additional exports planned for 1979—MTR reflector material to Pakistan, tritium targets to PAEC, plus beryllium metal and beryllium oxide to the Pakistan Directorate of Industrial Liaison—were "held up" by U.S. reexport requirements, Nukem officials were quoted as saying in the report.

The U.S. will not pay more attention to proliferation concerns in Germany, Western diplomatic sources in Bonn said. However, the sphere of influence of U.S. proliferation officials in Germany will be limited because other foreign policy issues—primarily modernization of Lance missiles stationed in Germany—will take precedence.

U.S. officials are also said to be taking a wait-and-see attitude regarding German pledges to tighten nuclear export controls (Nucleonics Week, 5 Jan., 3).

While proposed export restrictions might "put smaller fry like NTG out of business," one source said, non-proliferation officials are skeptical that larger nuclear establishment firms—such as Leyboid Heraeus GmbH—will be penalized. The future prosecution of Leybold Hereaus management for its role in exporting sensitive high-enriched uranium centrifuge equipment to Pakistan in 1987 is viewed by U.S. officials as a litmus test of German will to punish nuclear proliferators, sources said. The U.S. "will keep bringing up this case," one source said. German justice officials said the case is presently mired by problems of international law surrounding the alleged theft of Urenco enrichment know-how.

Diplomatic sources also said that the U.S. is looking for an avenue to exert "more direct influence" on officials in the Economics Ministry responsible for export control. One 1986 interoffice memo penned by an Economics Ministry official said that U.S. communiques warning of planned nuclear exports to South Asia "usually land in my wastepaper basket."

German Firm's Exports Raise Concern About Pakistan's Nuclear Capabilities

(By Mark Hibbs)

Information obtained by Nuclear Fuel about West German nuclear exports to Pakistan provides indirect evidence of intensified nuclear weapons research by the Pakistan Atomic Energy Commission (PAEC), Western experts said.

Because Pakistan does not appear to possess technology to detritiate heavy water, German criminal justice officials are puzzled about the purpose of a tritium gas storage and purification plant provided in 1987 by the German firm NTG Nukleartechnik GmbH (NTG), now called NTG Neuetechnik, (*NF*, 6 Feb., 7). "It is a subject we have been thinking about every day," said Hanau prosecuting attorney Reinhard Huebner.

According to western experts, however, Pakistan may want to irradiate lithium-6 targets—perhaps in an unsafeguarded research reactor—to obtain weapons-significant amounts of tritium gas. The plant provided by NTG, they said, would be capable of purifying this tritium gas to 98% as alleged by suspects' confessions in the case.

In amounts of about 4 to 5 grams, tritium, the heaviest hydrogen isotope, is used as a booster in a fission nuclear weapon.

Information obtained by Nuclear Fuel about the plant design indicates that the tritium facility erected and tested in Pakistan would not be capable of separating hydrogen isotopes present in impure tritium gas extracted from heavy water. This "effectively eliminates" the possibility that the plant is used to purify gas obtained by detritiating heavy water from the Kanupp reactor, one expert said.

In addition to the tritium isotope of hydrogen, "dirty" tritium gas obtained by detritiating heavy water contains large amounts of deuterium, as well as normal hydrogen. The three hydrogen isotopes must be separated in order to extract pure tritium.

Although U.S. proliferation officials repeatedly warned Germany about Pakistani intentions to acquire heavy water detritiation technology and although German export control officials indeed approved an application by NTG to export a heavy water detritiating plant to Pakistan (*NF*, 26 Dec. '88, 1), justice officials have no evidence that such a plant was exported to Pakistan.

The plant confirmed to be in Pakistan could, however, purify the gas product obtained from irradiated lithium-6 targets, since separation of hydrogen isotopes would not be required. Bombarding lithium-6 with neutrons produces an end product of tritium, large amounts of helium 3 and helium-4. "Pakistan is irradiating lithium targets," one U.S. expert said, "the German plant could give them a basically pure tritium product."

Western experts said that U.S. proliferation officials have been concerned for several years about the possibility that Pakistan was interested in procuring targets or lithium-tritium technology. A U.S. note to the German Foreign Office from March 13, 1986 expressed the concern that Pakistani agents in Germany were operating on the "international market" to be able to procure "tritiated targets" which could be used "at the Pinstech plant in Rawalpindi" to extract pure tritium.

Export documents indicate that prior to this date German officials approved exports of sub-kilogram amounts of lithium metal and lithium aluminum hydride to Pakistan and India. But according to officials from the Federal Ministry of Research & Technology (BMFT), which evaluated the export applications, the quantities exported were too small to have nuclear application.

Production of tritium via lithium requires bombarding the lithium-6 isotope with neutrons in a reactor. Western experts said, however, that it was not likely that PAEC would use the Kanupp heavy water reactor, which is under IAEA safeguards, for this purpose.

An official at the IAEA said that while heavy water at Kanupp is safeguarded along with reactor fuel, the control rods are not explicitly checked. "From a safeguards point of view irradiation of lithium at Kanupp would be a theroretical possibility," a U.S. safeguards official said.

But experts queried said circumstantial evidence points instead to the possibility that Pakistan may want to irradiate lithium-6 at an unsafeguarded, unknown research reactor. Because of the low melting point of the aluminum used in target cladding, irradiation in a Candu reactor core—where temperatures above 500 degrees F obtain—would also be undesirable, experts said.

One expert recently at PAEC said that Pakistan might be building a 50-MWt research reactor which could produce plutonium with a few high-enriched uranium "driver" rods in the core, but which could also be used to irradiate lithium targets. PAEC is "very proud" of its present capabilities in enrichment, reactor technology, and fuel fabrication, the source said. "I have no doubt PAEC has the means" to build the plant, he said.

Indirect evidence for the plant is provided by testimony in the NTG affair obtained by NuclearFuel.

Confessions of key suspects and documentary evidence indicates that NTG supplied "know-how for design and construction" of a "small, pool-type" research reactor which prosecutors said might not yet have been completed or erected. In 1987, NTG also supplied aluminum rods and tubes for this reactor.

According to information from Bonn export officials, during 1987, Inam Ul-Haq, identified by intelligence sources as a buyer for PAEC, attempted to buy 30 metric tons of aluminum tubing for the firm Multinational Incorporation in Lahore, Pakistan. A German firm unsuccessfully attempted to export the tubing to Pakistan via Italy, sources said.

Western experts said that the aluminum obtained by PAEC would be useful as cladding material for lithium-6 targets. Aluminum tubes are used for cladding because lithium-aluminum bondings are more chemically stable than lithium-zirconium bondings.

Western experts believe that it would not be difficult for Pakistan to acquire the technologies to enrich the lithium-6 isotope in lithium metal (over 90% of which naturally occurs as lithium-7) and then bond the cladding to the lithium. The process technology for the final step prior to purification—extraction of tritium gas from irradiated targets—calls for melting the targets in a high-temperature vacuum oven. Details are considered classified information in established weapons states, but engineers in Pakistan "could figure it out without too much difficulty," one weapons expert said.

According to documents, NTG exported to PAEC a high-temperature vacuum oven in 1987.

Beyond expertise for an unsafeguarded reactor, documents also reveal that PAEC also illegally obtained from NTG about 7,000 kilograms of fuel cladding material for Kanupp, the document indicate. This was procured in India and then shipped via Ger-

many to Pakistan, falsely declared as stainless steel tubing and not reported to German export control officials. Because of the word "nuclear" in the full name NTG, Pakistani agents "expressly requested" that the tube transfers be handled by Physikalisch-Technische Bundesanstalt (PTB), a consulting firm under contract to NTG, according to the West German documents.

[From Der Spiegel, Feb. 20, 1989]

NUCLEAR EXPORTS TO PAKISTAN REPORTED

Pakistan has the ability to build the atom bomb. West German firms supplied parts and know-how.

The laboratory is hidden in a desert at the foot of the Kashmir mountains. Anti-aircraft artillery protects the area, soldiers guard the doorways into and out of the laboratories, storehouses, and underground vaults.

In the laboratory, generators whir, selected scientists operate highly sensitive aggregates; measuring instruments, vacuum pumps, and automated precision tools work around the clock.

In the nuclear plant, which forms part of the nuclear center of Pinstech near Rawalpindi, elements for the Islamic bomb are produced in strict secrecy—with machinery made in Germany.

The German equipment—for the time being the last delivery—was tested on site by Peter Finke, 45, on behalf of the Geinhausen-based firm New Technologies (NTG). In July last year, the physicist showed his Pakistani colleagues for 2 weeks how to operate the complicated glove-compartment plant for the recovery of tritium.

Since then the scientist ("I am a pacifist") has had pangs of conscience; possibly the equipment could be "converted," he says. He stresses that anyway, a "pure training plant" was supplied—allegedly, in order to clean the tritium-contaminated Pakistani nuclear reactor in Karachi, which is, however, 1,100 km away.

Radioactive tritium is sold on the international black market of weapons-grade nuclear products at even higher prices than plutonium. A few grams of this gas are sufficient to increase the power of an explosive "substantially," says nuclear weapons scientist Gerhard Locke, 56, of the Euskirchen Fraunhofer Institute. Therefore, "the second bomb generation of the lighter type" cannot do "without tritium," he says.

However, the artificially produced superheavy hydrogen decomposes quickly into helium. Therefore, it must be constantly renewed.

That is precisely what the NTG plant can do: Every day, five grams of tritium can be recovered—a quantity which according to Locke is "incredibly large." That is why Albert Farwick, chief of the Nanau public prosecution which is investigating NTG, considers "some civil use practically inconceivable."

There is no doubt that Munir Ahmed Khan, chief of the Pakistan Nuclear Authority, with whom Finke already had a cup of tea, has secretly developed his country into a nuclear power; the bomb puzzle is complete. He had many individual parts—ranging from transformer sheets to uranium conversion—supplied by small West German firms, using a network of agents to this end.

The special pipes and supersolid steel from Singen and Saarbruecken, the mass spectrometers and magnets from Bremen and Bonn were made-to-measure for Khan's program which is carried out in a number of nuclear centers:

In Rawalpindi, where in addition to the bomb plant, a 24-year-old U.S. research reactor is in operation and a reprocessing plant produces about 20 kg of plutonium every year;

In Kahuta, Abdil-Kadir Khan, who is admired as "the new Einstein," meanwhile has produced more than 100 kg highly enriched weapons-grade uranium, using ultra-high-speed centrifuges;

At the Dera-Ghazi-Khan center, natural uranium is pulverized and converted into uranium hexafluoride, the initial product for further processing, in three conversion plants supplied by the Freiburg businessman Albrecht Migule for DM15 million.

The Pakistani "atom shopping" has often had Bonn's official approval. The Federal Economics Office (BAW) in Eschborn approved the export of an electronically controlled miling machine of the Munich-based Friedrich Deckel AG, which a secret U.S. study assesses as "extremely useful" for the "production of elements of a nuclear explosive system;" the Economics Ministry rejected as "unacceptable and irrelevant" the U.S. demand to guarantee that the machine not be used in the nuclear industry.

The export of a special press to compact hard-metal powder, which was supplied by Dieffenbacher GmbH & Co in the Swabian town of Eppingen in 1985, was also approved, even though the purpose of the machine (price DM1.3 million) was not kept secret. The responsible officials knew that the isostatic hot press was intended "for use in an ammunition factory for the manufacture of heavy-metal cores for projectiles."

What types of cores could be meant was discovered post facto by experts of the Federal Research Ministry: "A highly efficient nuclear explosive" must be compressed to the largest possible extent, and "the easiest way" to achieve this is by using a press that is hardly different from the Dieffenbacher model.

The press and the milling machine, made in Germany, were so-called dual-use goods that can also be used for peaceful purposes and are therefore not contained in the embargo lists. However, the U.S. Administration had warned Bonn in time about such deals. U.S. intelligence services reported in 1979 that with the blueprints that he stole in Almelo, in the Netherlands, Abdil Khan was now in a position to build a uranium enrichment plant. To this end, he would buy "equipment on the European market," they said.

U.S. President Jimmy Carter wrote to Chancellor Helmut Schmidt at the time that "we must be careful and prevent this program from being completed." U.S. experts specifically went to Bonn to instruct the responsible officials. They told them that two firms, the Hanau-based Leybold-Heraeus and the Renningen-based Team Industries, were already "doing business."

Several weeks later, two managers of the enterprises mentioned informed the Economics Ministry that the deals had been carried out. Team Industries had just shipped 31 frequency converters to Pakistan, highly sensitive instruments that are used for the power supply of uranium centrifuges. Leydold-Heraeus manager Gotthard Lerch reported that his firm had supplied valves, vacuum pumps, brazing furnaces, measuring instruments, and a gas purifying plant "in the past 3 years"—together "worth DM1.3 million."

Lerch also said that of course, "it cannot be totally ruled out" that such instruments are useful in a uranium enrichment plant. He said that in the future he will "keep an eye on the aspect of possible use."

He did so. Meanwhile, the Cologne public prosecution is investigating Lerch, because he allegedly smuggled cases of blueprints for the building of a uranium centrifuge out of the Federal Republic. At the same time, he had a number of special instruments copied in Switzerland, the investigators say. The individual parts, which were declared "cooper pipes, boilers, and crane girders," were transported across the French border by truck and were shipped in Air France planes from Lyon via Dubai to Pakistan.

The deal attracted attention after Swiss customs officers seized three specially large vacuum containers, so-called autoclaves.

The proceedings against Lerch have been dragging on for 2 years now. Only one West German exporter has been punished because of illegal nuclear exports to Pakistan: Albrecht Migule.

Quoting the Nuclear Nonproliferation Treaty, the judges said at the time that "owing to a law enforcement deficit, the FRG must accept being accused of having failed to meet its contractual obligations." They added that "the goals" of the nuclear nonproliferation treaty have been "attacked," because the authorities made it so easy for Migule that he did not have to proceed "particularly cleverly."

SPD Bundestag Deputy Hermann Bachmaier says that "the motto by which people in the Federal Economics Ministry work appears like a red thread in the files: You never hear anything, you never see anything—and in particular, you never block anything." Bachmaier, who heads the Bonn Nuclear Investigation Commission, says: "Our doors are just open."

The Karlsruhe Nuclear Research Center (KFK), which is 90 percent government-owned, also was involved in unrestrained exports. The KFK scientists supplied to their colleagues in Rawalpindi parts of a mass spectrometer, without which it is impossible to determine the degree of uranium enrichment. They trained Pakistani scientists, and even allowed one of them to visit their sanctary—the "hot cells" where plutonium is separated, and they passed on valuable know-how.

Even the Economics Ministry found the close contacts between Karlsruhe and the Pinstech laboratories "astounding." The ministry said that whereas "constant efforts are being made to inhibit the Pakistani nuclear program," the KFK "maintains very close contacts with relevant Pakistani authorities to convey know-how for just this nuclear program." No conclusions were drawn.

The same thing happened when roughly 100 kg of specially hardened steel was shipped from Bremerhaven to Karachi on 9 August 1985. The hot goods on board the "Nedlovd Everest" were just being shipped across the Red Sea, when it dawned on the German authorities that it might perhaps be the so-called maraging steel of Arbed Saarstahl, which is subject to approval and is indispensable for the inside casing of uranium centrifuges, the rotors. The investigators later wondered why "so much fuss" was made about the shipment which involves a number of minor order addresses; however, the proceedings were discontinued.

No matter whether computer systems where involved that can be used for the "control of weapons systems," highly sensitive electronic hardware or ring magnets which according to reports of the Federal Intelligence Service just corresponded to the dimensions of the Pakistani high-speed gas centrifuge of the second type (German version). A coincidence? The officials in the Bonn Economics Ministry always felt pestered, instead of feeling challenged to intensify their checks, when the Foreign Ministry passed on secret documents of U.S. intelligence services warning about planned deliveries.

Such "anonymous papers usually end up in my wastebasket," Buenter Welzien of the Federal Economics Institute furiously wrote to the Economics Ministry, wondering whether Bonn had "ever bombarded the Department of Commerce in a similar way?" Even when the Americans asked Bonn to find out about negotiations conducted by German firms on the possible sale of so-called cryotons—tiny electronic elements with which the time a bomb detonates can be determined with an accuracy of one-millionth of a second—the Federal Economics Ministry's reaction was particularly rough. A responsible official called Spies scribbled on a piece of paper: "I reject such employment measures on principle."

However, the request had not been that absurd, after all. Rudolf Maximilian Ortmayer, at the time NTG manager, reportedly also negotiated in Pakistan with a man called Sulfikar Ahmed Butt—the very Pakistani who had attracted attention in the United States when he was trying, via agents, to purchase 50 cryotrons from EG & G Inc. Wellesley, Massachusetts, the only producer in the world. Butt, who is considered to be the chief buyer for the Pakistani bomb builders, reportedly presented to Ortmayer a comprehensive wish-list.

However, the negotiations were only more specific regarding tritium: Butt ordered 10 grams.

The nuclear buyer soon was not interested any more in the heavy water clearing plant that the Pakistanis initially planned to buy, although Ortmayer had engineered everything so nicely to legalize the deal. He invited the responsible official of the Federal Economics Institute, Manfred Ruck, and the Bonn expert spies to see him in Geinhausen. Having a glass of sherry, the gentlemen discussed the export wishes.

Ruck wrote to his colleague Spies that the plant is absolutely harmless, comparable, "in a figurative sense, to a drinking water treatment plant."

The application was approved.

[From Defense & Foreign Affairs Weekly, May 15-21, 1989]

PAKISTAN PERFECTS N-DETONATOR, CHINA HELPS

Sources close to the Pakistani nuclear program have revealed that Pakistani scientists have now perfected detonation mechanisms for a nuclear device. Islamabad has successfully produced bomb casings which can withstand the buffetting of high speed flights. Such as device, it is learned, can be delivered by Pakistan's F-16s. It has been further learned that China is making arrangements for a Pakistan nuclear test, most likely at its Lop Nur testing ground. Over the past two years Pakistani scientists have been producing enriched uranium at the Kahuta plant. Pakistan's success has been made possible to a large degree by China. Informed sources have told the *Weekly* that China continues to help Islamabad in its nuclear ambitions. Chinese scientists have been visiting Kahuta and Pakistani scientists have been reciprocating the visits.

U.S. CANNOT HALT INDIAN, ISRAELI MISSILE PROGRAMS

US Assistant Secretary of State Allen Holmes has told the Senate subcommittee on defense industry and technology that Washington can do little to rein in the Indian and Israeli missile programs. Holmes is reported to have said that both New Delhi and Tel Aviv had developed indigenous missile programs, with marginal external support and Washington would have little or no leverage over the two respective programs. Meanwhile Senator Jeff Bingaman has been pressing US Commerce Secretary Robert A. Mosbacher to bar the sale to India of US ballistic missile testing equipment that he fears will directly aid that country in the development of its *Agni* ballistic missile, which has a range of 1,500 miles. The *Weekly* has learned that missile proliferation will be a major issue to be discussed between Secretary of State James Baker in his meetings with Soviet Foreign Minister Eduard Shevardnadze in Moscow later this week. Washington is expected to press the USSR to reconsider joining a seven nation Western undertaking to end the sale of ballistic missile technology to developing nations. The Bush administration is taking the missile proliferation issue very seriously and Washington is expected to remind Moscow that the Soviet Union has been "primarily responsible" for the delivery of thousands of Soviet-made *Scud* missiles over the past decade ot Iran, Egypt, Libya and Syria. US officials are hopeful that Moscow will agree to impose unilateral restraints because of growing Soviet concern about the proliferation of missiles capable of reaching Soviet territory in a number of countries including Israel, Saudi Arabia, Iraq and Iran.

[From Nuclear Fuels Magazine, Feb. 6, 1989]

GERMAN FIRMS EXPORTED TRITIUM PURIFICATION PLANT TO PAKISTAN

(By Mark Hibbs)

Two West German firms exported to Pakistan between 1985 and 1987 a plant for storage and purification of large amounts of tritium gas, according to German federal prosecuting attorneys. The firms, Neue Technologien GmbH (NTG) and Physikalisch Technische Beratung (PTB), have been under investigation since late last year on suspicions they violated German law (NF, 26 Dec.'88, 1).

Tritium gas can be used in nuclear fission weapons as an igniter or as a booster—the latter typically using about four grams of tritium gas. In microgram amounts, tritium also has civilian uses, such as in the watch industry and in medical research.

Industry experts queried by NuclearFuel, concurring with German prosecutors, said a civilian use for such a plant in Pakistan is difficult to imagine.

Moreover, 0.8 gram of tritium was exported illegally from Germany to Pakistan via Hong Kong to be used to leak-test the tritium plant. Part of that tritium was of Soviet origin, while the rest was produced from U.S.-origin heavy water in a German reactor.

Reliable sources said that prior to startup of the purification plant, Pakistani agents had tried unsuccessfully to import from a German firm at least 300 liters of tritium gas corresponding to about 65 grams of pure tritium at standard temperature and pressure.

Alfred Farwick, senior federal prosecuting attorney in Hanau, revealed details of the plant export January 26 in a closed session of the Bundestag (parliamentary) committee investigating the activities of German nuclear firms.

Hanau prosecutors have been investigating nuclear exports since they received information last fall that top officials from at least two companies, NTG and PTB, were believed to have violated the German Foreign Trade Act by exporting sensitive nuclear equipment and nuclear-related material to several non-NPT countries.

The plant installed in Pakistan can purify tritium gas contaminated with helium-3, oxygen, and deuterium, sources said. Experts explained that "dirty" tritium gas, stored on large absorber beds, is heated and passed through a uranium filter that captures the impurities by forming metal hydrides, yielding 98% pure tritium on the other side of the filter.

According to information obtained by German prosecutors, the total holdup capacity of the purification plant sent to Pakistan is 100,000-240,000 curies of tritium gas. Industry sources suggested that the daily throughput of the plant would be approximately 5,000-10,000 curies, the equivalent to production of 0.5-1.0 gram/day of pure tritium gas. One source said this would be an "enormous amount for a country like Pakistan."

The plant would be able easily to purify all the tritium gas—estimated to range anywhere from 200,000 to 2-million curies—present in the heavy water moderator system of the 137-MW Kanupp reactor—Pakistan's sole official potential source of tritium.

The large size of the plant is fanning speculation that Pakistan may have sources of unsafeguarded heavy water, since purification of tritium gas distilled from all Kanupp's heavy water would take only 200 days at the plant's nominal throughput of 10,000 curies/day. Experts said it would be extremely unusual to detritiate an entire heavy water inventory in a single step. The plant, one industry official alleged, would be "big enough to accommodate" the western world's total annual civilian requirement for pure tritium gas. "I can't believe that a plant that size can have a peaceful use in Pakistan," he said.

Western experts are puzzled, however, about the absence of direct evidence that Pakistan has acquired the technology necessary for detritiating heavy water—a key link in the process chain which starts with tritium-contaminated heavy water and ends with "clean" heavy water and purified tritium gas as a byproduct.

When heavy water is used as a moderator for natural uranium reactors, it becomes contaminated with tritium over time and must be decontaminated using cryogenic distillation technology—a "sophisticated affair," one western engineer said. "Pakistan would have little use for a tritium gas purification plant if it didn't have the upstream technology to detritiate heavy water," he said.

So far there is only indirect documentary evidence that Pakistan has acquired heavy water detritiating technology. In 1984, NTG informed the Bonn government it planned to export a "heavy water purification plant" to Pakistan (Nucleonics Week, 5 Jan., 3). Sources said the matter led to a dispute between the Economics Ministry, which controls nuclear exports, and Foreign Office officials who had been asked by the U.S. government to intercede, after U.S. intelligence got wind of the planned export. Washington believed two firms—Linde AG and Sulzer—may have been involved in the planned export to Pakistan.

Despite the U.S. appeal, in September 1985, the Federal Economics Office (BAW) ruled officially that a license was not required for export of a "heavy water purification plant" to Pakistan.

While prosecutors said the tritium plant in Pakistan cost about DM 2.5-billion ($1.4-million), a Bonn legislator said the total value of the planned tritium technology export was about DM 13-million ($7.2-million). The difference might be accounted for by the more expensive upstream detritiating equipment, an industry source said.

According to prosecutors, although PTB director Peter Finke went to Pakistan to test-operate the completed facility, Finke

said he was never told, and could not ascertain, the facility's precise location. Finke said he concluded, however, that it was not in the vicinity of the Kanupp reactor.

Prosecutors are now investigating the German source of Pakistan's tritium technology. The staff of one German nuclear research center may have been involved, as well as a former employee of Nukem GmbH who had access to tritium process technology because of a previous tritium joint venture. A scientist at the Max Planck Institute for Plasma Physics in Garching is also said to have contributed to Pakistan's tritium expertise.

The 8,000 curies of pure tritium gas used to test-operate the plant in Pakistan were obtained for PTB from a German heavy water reactor and from the USSR by two other firms: Gutekunst, a manufacturer of luminous paints in Schwennigen, Germany, and chemical isotopes company Radium-Chemie AG of Teufen, Switzerland.

Sources said it is unclear where Pakistan might obtain impure tritium gas to feed into the purification plant. Large amounts of deuterium in the "dirty" gas would point to an unsafeguarded heavy water supply in Pakistan, one expert said. Large amounts of oxygen in the feed gas, however, would indicate that Pakistan is producing tritium gas by bombarding lithium-6 targets in a reactor with alpha particles—a technology used by nuclear weapons states. This could mean, according to one source, that Pakistan has constructed a secret unsafeguarded reactor.

GERMANY MAY HAVE APPROVED EXPORTS BY PROSECUTOR TO BE ILLEGAL

(By Mark Hibbs)

Some nuclear-related exports from West Germany to non-signatories of the Nuclear Non-Proliferation Treaty (NPT) apparently were officially sanctioned by the German bureaucracy and supported by legislators in the Bundestag. At least two of the items originally alleged to have been exported illegally—a tritium extraction plant sent to Pakistan and an ultrasound fuel testing device sent to South Africa—may have left Germany quite legally, the latest information indicates.

On December 21, the senior federal prosecuting attorney in Hanau, Alfred Farwick, announced that suspects from the firm NTG-Neue Technologien GmbH (NTG) and the nuclear consulting firm Physikalisch-Technische Beratung (PTB), "illegally exported nuclear technology to Pakistan without the required permits" from the Federal Economics Office (BAW), an arm of the Federal Ministry of Economics in Bonn (NF, 26 Dec. '88, 1; Nucleonics Week, 5 Jan., 3). NTG was known until 1986 as NTG-Nuklear-technik GmbH. The firms were said also to have exported various nuclear equipment and technology to India and South Africa.

Since the, more suspects have signed confessions and the official investigation has widened to other parties, reliable German sources said.

Last week, Federal Minister of Environment and Nuclear Safety (BMU) Klaus Toepfer suspended the nuclear licenses of a third firm, Gutekunst, after Hanau prosecutors said it may have been involved in procuring tritium gas and nuclear technology for PTB and NTG, possibly in another country.

According to confessions leaked to the conservative daily Die Welt last week, another small trading company called Rieckermann in Hamburg served as an NTG broker with Pakistan. In addition, former directors of NTG and PTB were said to have been in Pakistan about 20 times until agreement was reached on terms for the export of tritium extraction equipment and 300 liters of tritium gas. According to officials from BMU, much less tritium—about 8,000 curies, or just under one gram—was actually delivered from Germany.

U.S. officials knowledgeable about nuclear weapons technology said that one gram of tritium would be far more than Pakistan would require for commercial purposes, but just under the quantity needed for use in a nuclear weapons.

Officials in Bonn called on the Pakistan embassy last week, after suspects alleged that the former Pakistan ambassador to Germany acted as a courier between the exporting firms and agents in Pakistan. A spokesman for Chancellor Helmut Kohl said that as the present Pakistan ambassador claimed he knew nothing of the matter, Bonn would not take further diplomatic action for the time being.

The ultrasound device for fuel fabrication exported to South Africa—termed "measuring technology" in the prosecutors' original report on December 21—appears to be a fuel clad quality control device manufactured and supplied by Nukem GmbH.

The so-called ROTA-25 ultrasound testing device, used to check the neutron porosity of zircaloy fuel cladding, was supplied by Nukem to yet another small German firm, GASA, which did a large volume of business with South Africa before filing for bankruptcy last fall. According to company officials, Nukem Knew the equipment was destined for South Africa and assisted in making the device operable after it was delivered. Nukem cleared the sale with federal export control officials at BAW, who ruled on March 8, 1985 that no export permit was necessary.

Nukem officials said direct military use of the Nukem technology by South Africa is "out of the question."

The export of a tritium extraction plant to Pakistan may also have been legal. According to information obtained by Nuclear Fuel, NTG informed Bonn in 1984 of its plans to export heavy water purification technology to Pakistan. The planned sale led to a dispute between the export-promoting Economics Ministry and the Foreign Office, responsible for ensuring Gemany's commitment to nonproliferation.

A senior U.S. State Department official told Nuclear-Fuel last month that Germany "has always shared our concern about the potential for illegal exports to unsafeguarded programs and has been fully cooperative." However, documents in the case show that Washington's plea to block the export of tritium technology was rejected by the German bureaucracy.

In a message dated March 13, 1986, the State Department said an export of such technology to Pakistan from a U.S. firm "would not have been approved" and urged Bonn to block the sale. The German Foreign Office, fearing the export would damaged Germany's nonproliferation credentials, encouraged the Economics Ministry to block the export.

An Economics Ministry note dated April 25, 1986, said that NTG management had requested the firm not be named in discussions of the delicate export license matter. They said NTG management feared terrorist reprisal if it became known the firm was negotiating to export nuclear technology to Pakistan.

Nonetheless, NTG's planned export of tritium technology to Pakistan appears to have been no secret to federal legislators. On May 7, 1985, a Christian Democratic (CDU) Bundestag MP from the state of Hesse (where the firm is located), wrote to Rudolf Sprung, parliamentary state secretary in the Economics Ministry, urging support of the NTG export to Pakistan in the interest of local jobs.

[From Hemburg DPA, Jan. 30, 1989]

FIRM SAID TO EXPORT MISSILE COMPONENTS TO LIBYA

KARLSRUHE (DPA)—Highly valuable missile components have been transported to Libya according to a report in the "BADISCHE NEUESTE NACHRICHTEN" (BNN) via a firm in northern Baden. As the newspaper, which is published in Karlsruhe (Tuesday edition) [31 January] reports, quoting Gustav Eduard Michaelis the president of the Karlsruhe Finance Office, this illegal export was discovered last year by customs investigators. As investigation was started on the possible violation of the law on the control of weapons of war.

Out of concern for the enquiries which were still in progress, the Karlsruhe Higher Financial Directorate refused to give further details on the extent of the arms dealing. The name of the firm was also not given. This is not the only occurrence of transportation of weapons to Libya through northern Baden, the paper quotes Michaelis as saying.

[From Hambury Der Spiegel, Jan. 30, 1989]

COMPANIES EXPORTED BERYLLIUM TO INDIA

[Excerpts] Bonn authorities permitted the export of beryllium to nuclear-weapons-possessing India in 1984. Beryllium is used for constructing bombs. [passage omitted]

According to sub-paragraph 0112 of Bonn's "export list B," which is intended to prevent exports of nuclear goods that can be used for the production of weapons to problematic countries, the export of beryllium is classified as strictly requiring an export license. However, as is coming to the surface now, in the spring of 1984, the Hanau-based Degussa company is suspected of having exported 95 kg to India, of all countries, a country that has nuclear weapons-and Bonn had "non objections."

The deal which was authorized by the authorities of the then Economic Minister Otto Graf Lambsdorff (FDP), and Foreign Minister Hans-Dietrich Genscher, might become the cause of new irritations in FRG-U.S. relations. As can be learned from the application papers, which Der Spiegel has, the bulk of the material came from the United States; as middleman, Degussa passed the hot goods on to India.

The transaction took place at a time when, internationally, the rumor was growing stronger that, after its atomic bomb, India was about to develop its own hydrogen bomb. The delivery was forwarded to an address, which, according to FRG nuclear researcher Gerhard Locke, is "most suspicious": The Bhabha Atomic Research Centre (BARC) in Trombay, north of Bombay.

This center likes to boast its nuclear developments in the fields of medicine and agriculture. However, the Indians are less ready to supply information concerning the military part of their research.

International safeguard controls have no access to information regarding the amount of plutonium—the stuff of which the bomb is made of—the nuclear reactors in Trombay breeds. What is certain is that the material for India's first nuclear explosion in 1974 was provided by Trombay. U.S. experts estimate its present plutonium production at some 25 kg per year.

What is strange is that by consenting to the Degussa deal on 15 May 1984 with a specific form, the ministries in Bonn discarded any "suspicion of abuse of beryllium for nuclear purposes." Last week, Degussa itself,

parts of the shares of which are held by a subsidiary of the Henkel Washing Powder Company and Dresdner bank, did not find anything objectionable to the deal with India. According to company spokesman Joachim Nimtz, the delivery "was carried out with the permission of the authorities."

On 21 October 1983 the Federal Economic Office (BAW) accepted the first of two applications for exports by the Hanau enterprise. Only 4 months previously, in June 1983, the Reagan Administration had stopped all U.S. deliveries of this kind to India—at that time secret intelligence services noticed intensive efforts by India to start a second nuclear test, possibly with a hydrogen bomb.

Similar reports were spread by the Federal Intelligence Service (BND) almost 2 years later. The "BARC Nuclear Research Center In Trombay," the BND warned in a classified report of May 1985, has been ordered by the Indian Defense Ministry to "continue work on developing a nuclear fusion weapon (hydrogen bomb)."

In its application for exports, Degussa put under the heading "use" "research and development work" in smelting, compressing, and casting of beryllium, which is often used for alloys. Material of "high purity"—at least 98 percent—had been ordered. Degussa added a telex of the Indian Nuclear Ministry (title as published) to the documents for the application. In this telex a government representative claimed that India does "not have any program for the production of nuclear weapons."

According to experts, the amount of beryllium ordered at that time makes sense: 95 kg—this is "a manageable amount for about 20 bombs," arms researcher Locke says.

In building a hydrogen bomb, the metal can be put around the radioactive core as a sheath. The desired effect: According to Locke, the neutron-multiplying properties of the relatively cheap beryllium reduce the demand for valuable plutonium "by a factor of about two."

The Bonn experts cannot have ignored this possibility of use: experts of the FRG Research Ministry expressly warned against the fact that the metal can "be used as a neutron reflector for the construction of nuclear weapons," when they had to deal with an application for the export of 60 kg of beryllium nitrate to India in February 1980.

Only because—as the BAW calculated—"at the most 2.637kg" of pure beryllium can be produced from the nitrate was the permit issued at that time.

The Research Ministry experts noted that for the building of bombs India needs "amounts ranging in kilograms". These were delivered 4 years later—almost 100kg.

[From the New York Times, May 7, 1989]

NORWAY DETAILS HOW HEAVY WATER WENT TO INDIA

(By Sanjoy Hazarika)

NEW DELHI, May 6.—Norwegian investigators say they have evidence that material that could be used in the manufacture of atomic weapons was illegally shipped to a Bombay company in 1983. The company is listed in the Bombay telephone directory as an affiliate of the Indian Government's Department of Atomic Energy.

The Norwegian investigators say their evidence of the shipment, involving 21 tons of deuterium oxide, or heavy water, is a document and a statement from a witness. But the chairman of India's Atomic Energy Commission, M. R. Srinivasan, denied that such a transaction had taken place.

"At no stage have we bought heavy water from Norway," Dr. Srinivasan said in an interview. "We do not know the veracity of these documents; we have not had anything to do with Norway. We are one of the most important producers of heavy water in the world and we do not have any imports except from the Soviet Union."

It has been previously reported that India obtained heavy water from Norway and the Soviet Union, but this is the first time that Norway has given details of the company that they said received the shipment at Bombay.

Norwegian officials say they have the original flight document that traces the shipment from Oslo to Basel in Switzerland and then to Dubai in the United Arab Emirates and finally to Bombay. They are also relying on testimony by a man hired by a West German company to accompany the cargo.

Under the Nuclear Nonproliferation Treaty, shipments of more than one ton must be reported to the International Atomic Energy Agency and put under safeguards if shipped to countries like India, which has not signed the treaty. That was not done in the case of the 1983 shipment.

Heavy water is used in reactors to slow the neutrons emitted in nuclear fission to a speed at which they cause additional fissions. Ordinary water can also be used, but it absorbs neutrons and therefore requires use of enriched uranium, which is expensive and difficult to make. With heavy water, reactors can run on natural uranium. Reactors using uranium produce plutonium, a bomb fuel, as a byproduct.

Plutonium is also used to start new atomic reactors, and Dr. Srinivasan, the nuclear official, has said that critics who say that India is diverting the material to a nuclear arms program overlook this point. In an interview last year, he said that 50 kilograms of plutonium were used in 1985 to start up a new "fast breeder" test reactor that uses raw material available in India.

Although most of India's nuclear plants are not open to international inspection, New Delhi has denied having a secret weapons program. Its capability of building a nuclear weapons system was shown, however, when it exploded what it called a peaceful nuclear device in 1974.

Norway said a West German company, Rohstoff Einfuhr, bought 15.18 tons of heavy water from Norway in 1983, flew it to Basel in Switzerland by West African airlines. Then, with the addition of six tons of Soviet heavy water, it was flown to Dubai and India. The consignment landed in Bombay, the Norwegians said, about Dec. 7, 1983.

The Chief Public Prosecutor for Oslo, Anstein Gjengedal, who is leading the investigation of the shipment, said in a telephone interview that he did not know whether the destination was an Indian Government department.

"All I have is an address in Bombay, not a name, and we have found this address on a freight document written in West Germany and we still do not know if this is the end user," he said.

Mr. Gjengedal said the address on the freight consignment document listed the Directorate of Purchase and Stores at Palton Road in Bombay as the consignee. He quoted a West German national who reportedly accompanied the flight to India as saying that the consignment was "handed over to this address."

A visit to the address given by the Norwegians showed that the department had moved. A security official at the Directorate's office said the office was move "three or four years ago." The Bombay telephone directory lists the Directorate under a listing for Central Government offices of the Atomic Energy Dpartment.

[From Jane's Defence Weekly, Apr. 22, 1989]

CONTROLLING THE SPREAD OF BALLISTIC MISSILES

(By Barbara Starr)

CIA Director William Webster predicts that by the year 2000, at least 15 nations will be producing their own ballistic missiles.

"Although missiles being developed by these countries are somewhat crude and inaccurate, many of them have capabilities well beyond battlefield range and can strike in a matter of minutes," Webster said.

He did not identify the 15 countries, in a speech following Congressional testimony in which he warned of the proliferation of nuclear, chemical, and biological weapons, especially in the Middle East.

Webster says as many as 20 nations are developing chemical weapons and 10 countries are working to produce biological weapons.

As missile attacks on cities in the Gulf War accelerated in the 1980s, seven industrial nations announced a new effort in April 1987 to curb the transfer of technology that could enable other nations to develop ballistic missile systems.

Yet since the formation of that Missile Technology Control Regime (MTCR), a seemingly unstoppable number of nations have continued to proceed with development of long-range missiles capable of derlivering nuclear warheads, as well as chemical or biological weapons.

The MTCR attempts to control missile technology exports through the co-ordination of the seven member nations: the United States, Canada, France, the UK, Italy, Japan and West Germany. The Soviet Union, China and Israel are not signatories.

Non-proliferation advocates say Third World nations have to go to these 10 suppliers for reliable and usable technology.

The MTCR has had only moderate success as a limiting force. Yet, as Webster said, it does not include "key players in today's missile and advanced technology market.

"The agreement also does not reduce the incentive or ability of Third World nations to develop ballistic missile technology on their own."

Moreover, critics say the MTCR does not take a strong enough stand against export of so-called dual use items, such as components which could easily be transferred from a space programme to a missile programme.

For example, US officials are keeping a close eye on whether India is using technology gained in its space programme for its ballistic missile test programme. India is reportedly planning the first test launch of its Agni medium-range ICBM, said to have a 2000 km range, next month.

The MTCR is not an official treaty, and there is no ruling body to administer sanctions or controls. Each member nation must develop its own laws to control exports restricted under the MTCR.

"The only enforcement mechanism is if the CIA finds out a nation is doing something it shouldn't," says Gary Milhollin, a former nonproliferation consultant to the Pentagon. "The MTCR is not going to stop the spread of ballistic missiles to the Middle East. It is too little, too late."

The regime does provide for a detailed system of regulating the export of certain materials and components that could be used in ballistic, as well as cruise missiles.

Under the terms of the agreement, an envelope is established whereby there is a strong "presumption of denial" to export

items capable of delivering at least a 500 kg payload to a range of at least 300 km.

According to the official text of the regime, this means member nations will generally agree not to export "complete rocket systems (including ballistic missile system, space launch vehicles and sounding rockets) and unmanned air vehicle systems (including cruise missile systems, target drones, and reconnaissance drones)" that fall within those capability parameters.

Also not to be exported are individual rocket stages, re-entry vehicles designed for non-weapons payloads, some solid or liquid fuel rocket engines, some types of guidance sets, and arming, fuzing and firing mechanisms.

Another category of items is established where exports are more readily permitted if it is determined on a case-by-case basis that the components will not be used for ballistic or cruise missiles.

These include lightweight turbojet and turbofan engines, ramjet and scramjet engines, some liquid fuel control systems and propellants.

This complex regime has yet to stop some key nations, however. For example, recent reports indicate that Egypt is co-operating with Argentina and Iraq on the development of the SS-1C Condor II with a range of up to 1000 km.

The Condor programme has experts around the world worried. It is a potential threat to Israel—but the UK is also worried that Argentina could use it against the Falklands (Malvinas).

A report in the Argentinas newspaper suggests nowever that Israel is pressing Argentina to end the relationship with Cairo, in return for which Israel will deliver 12 promised A-4Q aircraft.

In response to international pressure, the West German Government has been taking a closer look at missile technology exports. But many in the US Congress are critical.

Rep. Howard Berman alleged recently that West Germany's largest aerospace firm Messerschmitt-Bolkow-Blohm (MBB) has played a key role in Condor II and that Fiat's SNIA-BPD is also contributing components. "There is also reliable evidence that MBB is participating in a separate Iraqi missile project in the northern city of Mosul, the suspected site of Iraqi chemical weapons development," he said.

Berman, and a bipartisan coalition of four other Congressman, have introduced legislation to strengthen the MTCR.

The legislation would require the President to impose at least one of the following sanctions on any company he finds in violation of the MTCR: denial of US export licenses; denial of US Government contracts; and/or a ban on imports into the USA.

"Perhaps our allies have done as much as they politically can. But by enacting this legislation, the United States can do more. Companies engaged in these projects will be forced to forego their business with us if they continue to pursue the profit gained by this extremely risky and ill-advised business," says Berman.

[From International Defense Review, 1989]

INDIAN IRBM DETAILS REVEALED

For the first time, India has officially admitted the existence of the Agni surface-to-surface IRBM. IDR understands that its first firing will take place shortly from the Interim Test Range at Baliapal in Orissa State. Agni (Fire) is the biggest and longest-range missile being developed by the Defense Research & Development Laboratory (DRDL) at Hyderabad under the Integrated Guided Missile Program launched in 1983. Its design team was headed by Dr. P.J. Abdul Kalam, Director of DRDL, who had also been in charge of the earlier Prithvi program (see IDR 5/1988 p. 478).

Significantly, the first stage of Agni is the solid-propellant first stage of the SLV-3 satellite launch vehicle. The four-stage SLV-3 was also designed by Dr. Abdul Kalam, while at the Indian Space Research Organisation (ISRO). It has a three-segment polybutadene acrylic acid acrylonitrile (PBAN) solid-propellant charge. The 10m-long, 1m-diameter stage weighs 10,000 kg. While its thrust and burning time are not given, the thrust should be over 20t, since the complete SLV-3 weighed 17t at lift-off.

For the first time, India has thus used a component of its purely civilian space research program for a military application. (Under former Chairman Dr. Satish Dhawan, ISRO had consistently opposed any military application for its SLV-3 or any other product).

The Second of Agni's two stages has a storable liquid propulsion system. While the 250km-range Prithvi, first test-fired on 25 February 1988, has a low-energy propellant combination of RFNA and xylidene and the same could also very likely be used on the Agni upper stage, India also has the N_2O_4/UDMH technology in hand.

Press accounts state that the Agni will have a "twin-microprocessor-based missile-guidance computer with interrupt-driven real-time software". Design work on the control and guidance system was also undertaken at DRDL, with collaboration from researchers at the Indian Institute of Science, Bangalore, under the Joint Advanced Technology Program. The earlier Prithvi has an advanced inertial navigation and guidance system, as well as an onboard mission controller.

The Agni, with a range probably exceeding 2,000 km, is expected to have a conventional warhead. While no details have been released, the warhead is likely to be extremely heavy, and there may be various types for deep strikes against high-value targets.

[From Hamburg Der Spiegel, Mar. 27, 1989]

FIRMS INVOLVED IN IRAQ MISSILE PRODUCTION

Iraq is building its own missile production. Technology and know-how for the research center were delivered by German companies.

On 5 August 1987 at 1602 telex machine "298078 Con MIK" starts to rattle. Telex number 3368 goes "to Gipro site office" and starts with a call for help:

"Since at the moment it is hardly possible to reach a competent person at project Saad 16," the "very esteemed gentleman" Nitsche and Isele are asked to convey the "list of training companies with the appertaining dates of the courses."

The telex line belongs to the Vienna Consultco Limited. In Al Thakafiya Street [spelling as published] in the north of the Iraqi university town of Mosul this Austrian construction company has a joint office with the Bielefelder Gildemeister Projecta Limited (Gipro).

Gipro is the general contractor for Saad 16—a project for which "laboratories and workshops comparable with facilities for technical colleges and test institutes" are being built, according to the Gipro management.

The comparison is misleading: In reality Saad 16 is the currently largest and most secret armament project in Iraq. Documents and eyewitness reports available to DER SPIEGEL are substantiating the suspicion: The facilities being constructed on the northern rim of the town on the Tigris River are certainly not the harmless institute that "is to be operated in cooperation with Mosul University," as the Gipro management claims.

Telex number 3368 proves: German companies are involved much more in the project than has been assumed to date.

Dozens of FRG companies have delivered technology and know-how for the "Technology Center," in which—according to intelligence information—missiles and chemical weapons are to be developed. The Iraqis are basing their work on preliminary work done by Egypt and Argentina—the Condor 2 missile project. Its goal is the development of a precise intermediate-range missile whose range could cover the entire Middle East.

The beneficiary of FRG business efficiency is a dictatorship, which is striving for regional supremacy after 8 years of war in the Gulf, which tried to break the resistance of its own Kurdish minority in the north of the country with cowardly poison gas attacks in violation to international law, and which has recently been accused by the human rights organization Amnesty International of systematically torturing even children.

A structural diagram from the documents of a company involved in Saad 16, which was published in the previous edition of the Austrain magazine PROFIL, proves FRG influence on the DM1.5-billion project: According to this, 5 years ago the state-owned Iraqi company Saad General Establishment contracted Gildemeister Projecta in contract number 16/1/84 as the general contractor for "technology" and Consultco as subcontractor for the "civilian parts" of the project—overground workings and foundation work as well as transportation and insurance.

The most important deliverer of technology of the planning company Gipro became Messerschmidt-Boelkow-Blohm (MBB), a Munich aircraft company, which has been developing various kinds of flying armament for decades—from the Tornado fighter bomber to the Fighter 90, from antitank missiles to large-scale missiles. MBB is participating in the Mosul deal with DM77 million. The people from Munich and Bielefeld hired several other subcontractors. "As a German company," the Gipro management assured DER SPIEGEL, "we tried to contract German producers for the delivery of equipment if it was possible in any way." Obviously with success.

From the German BP to Carl Zeiss, from Degussa to Tesa—renowned companies are working for the Saad 16 project: 38 FRG companies are dealing with a comprehensive training program for Iraqi experts, which are to be trained in operating chemical laboratories and electronics workshops, wind tunnels, and physical test facilities.

The list of contractors in a monthly Gipro report also contains companies which have repeatedly been suspected of dubious arms deals.

Fritz Werner Industrial Equipment Limited provided a universal drilling machine. The company from Geisenheim, which is 10-percent state owned has been conducting profitable arms deals for years, also with Iran, Iraq's enemy in the Gulf war.

By far, the most comprehensive monthly delivery in July 1987 was ordered at Karl Kolb Company. The public prosecutor is currently investigating this laboratory equipment company because of the suspicion that the Hesse firm delivered poison gas facilities to Iraq.

The Rheinmetall cannon production company is involved via its subsidiary Aviatest, providing two wind tunnels; and with the Mauser gun manufacturer another FRG

arms producer is listed in Gipro's order books.

There is even a direct missile trace from MBB to Iraq, which has now been retraced by PROFIL journalists Herbert Langsner and Alan George. The Munich company has been involved in the Argentine Condor I Project since 1979, which first was allegedly destined to build a weather research rocket. Soon it turned into a "multipurpose" missile.

Not quite 2 years ago, when it had long become clear that the Argentines were working on a military missile program, MBB had to cease cooperation upon pressure by Bonn. MBB engineers, which were hired by partners of the Munich company in the Condor project, remained in business—and with them the technical know-how of the Bavarians.

Insiders believe that the old Condor crew are now providing their technical knowledge to Iraq for serial production of those weapons that are developed near Mosul. Europeans report from Baghdad that a top secret production facility is currently being established somewhere in northern Iraq.

Gildemeister is able to present a clearance certificate for the dubious deals—clearance number 48422 of the Federal Economic Office.

"For presentation to the customs authorities" the Federal Economic Office attests to Gildemeister Projecta Limited that "according to current rules, machinery, electrical equipment, regulation, measuring, and testing instruments for a research, development, and training institute with eight main sections, name: Project Saad 16, do not need an export permission."

The subcontractors also stress that their deliveries were legal. Peter Resz Czynski of the Hamburg Koerber AG assures that Blohm company, a member of the concern, has in no way delivered computer-controlled grinding facilities, which are subject to export permission, to Iraq. In 1985 and 1986 three standard grinding machines, type HFF 512 and Hanseat 11, "older model" (Resz czynsik) were ordered. Operators were trained for these machines in Germany and Iraq. "Everything completely harmless," Resz Czynski says.

MBB spokesman Udo Philipp also wants to give this impression. Testing centers "for surface analysis" and calibration labs were sent to Iraq. However, Philipp admits, "something like this" can "also be used for military purposes."

Gipro, too, does not want to absolutely exclude the possibility that the technology center, all of which will be handed over to Iraq "by mid-1989," could be used militarily: "In general, all universal products and facilities can often be used for several purposes."

However, what eyewitnesses have seen on site and what is proved by construction plans, goes far beyond the mere possibility of military utilization. Saad 16, located in a valley 1 km off the transit road to Sachu (spelling as published), is strictly guarded with electronics and video cameras by the military.

The more than 3.3-km-long fence is equipped with watchtowers, the main entrance is equipped with quick-action barriers. Mercedes Unimog vehicles, which are equipped with radar antennas, are patrolling between the buildings. Bungalows for managers, a first-aid station, a fire brigade, and an independent energy supply stress the isolation from outside.

Camouflage and bunkers emphasize the military character of the facility, whose center is a more than 100-meter-long hall for the construction of prototypes. In the northern part of the area a 120-meter-long subterranean shooting gallery—4 meters wide and 4 meters high—was tunneled into the mountain. The walls, insulated with noise-proof naps, look as if a chicken farm had donated its annual stock of egg cartons to this.

In a side valley to the west, there are 28 so-called resistance buildings, which have particularly stable roofs that are slanting down on one side and three stable walls, the fourth wall, on the other hand, is made only of wood. Thus, in case of laboratory accidents, the pressure of an explosion is purposefully directed into a harmless direction. Most of the 58 chemical laboratories are located there.

Adjacent, protected by walls on all sides, there is a missile test stand with control rooms and climate chambers. The buildings with measuring laboratories (from MBB), which are close by, are also protected by a 150-meter-long wall against the chemical laboratories.

Several times the speed of sound can be stimulated in the 12-meter-long wind tunnels, and the 27 electronics laboratories have a nonechoing room built by Siemens.

"Only if one is inside this room," an insider says ironically, "can one overlook that this is a military project."

[From the Washington Post, May 3, 1989]

U.S. FIRMS HELPED IRAQ GAIN ABILITY TO MAKE MISSILES, OFFICIALS SAY

(By David B. Ottaway)

Before U.S. export restrictions in 1987, some American companies sold equipment that helped Iraq build a military-industrial complex capable of developing missiles, U.S. officials disclosed yesterday.

"We're aware of the fact that American technology was sold to the Saad 16 complex," said a U.S. official, who described the facility near Mosul in northern Iraq as "a defense-industrial establishment" involved in engineering and manufacturing missiles, planes and other military items.

The disclosure came amid a U.S. diplomatic drive to get West European nations to crack down on companies selling technology and expertise to Third World nations seeking to build missiles or chemical and biological warfare plants.

The United States imposed a ban in 1980 on the sale by U.S. companies of all military equipment and so-called "dual-use" items—those with civilian or military application—to Iraq and Iran during their 1980-88 Persian Gulf war.

Whether the American equipment at the Saad 16 complex were "dual-use" items was not immediately clear. But U.S. officials insisted no U.S. export laws were violated by the American firms.

The officials refused to disclose the firms' names, but said the equipment provided to the Iraqis was "relevant to missile production" and sold "directly or indirectly" to the Saad 16 complex.

A spokesman for Hewlett-Packard Co., the California computer firm, said in a telephone conversation last night in 1985-86, the company had delivered "electronic equipment of various types" to the German company, Messerschmitt-Boelkow-Blohm (MBB), under a license authorized by the German government and the U.S. Department of Commerce.

"The end-user on the license was shown as the State Organization for Technical Industries-Saad General Establishment," Hewlett-Packard spokesman Richard Harmon said. He added that the Iraqi organization was described as "an institute for higher learning."

He added, "In summary, anything delivered to Saad was done through MBB and subject to a specific authorization."

A spokesman for another U.S. firm, Wiltron Co., in Morgan Hill, Calif., which makes electronic test and measuring instruments, confirmed that in early 1987 WI[illegible] had sold a $50,000 "scalar analyzer sy[illegible]" to its subsidiary in Germany, which in [illegible] provided it to MBB for the Saad com[illegible]. Peter Chalfont said the firm had obtained a Commerce Department license indicating that the Saad site was the end user.

In testimony yesterday before a Senate Armed Services subcommittee, W. Seth Carus, an expert on missile proliferation at the Washington Institute for Near East Policy, referred to recent reports in West German and Austrian media that U.S. companies "may have supplied 40 percent" of the equipment for the Saad 16 complex.

State Department officials confirmed U.S. involvement in building the complex but said "it was not clear" on what the 40 percent estimate was based.

They said it was legal for U.S. companies to obtain export licenses to sell certain high-tech items abroad until restrictions were imposed by the Missile Technology Control Regime (MTCR) signed by the United States, Canada, France, West Germany, Italy, Japan, and Britain in April 1987.

The regime bans export of missiles or their components and any technology or equipment related to the production of ballistic and cruise missiles capable of delivering a payload of at least 500 kilograms to a distance of 300 kilometers or more.

"They (U.S. firms) obtained export licenses and nothing illegal was done," one U.S. official said.

However, congressional sources said that in 1985, two years before it formally committed the U.S. to the MTCR, the Reagan administration had begun adhering informally to the regime. They questioned whether licenses should have been issued in the 1985-87 period.

U.S. officials said while the United States had sought to adhere to the MTCR terms since March 1685, the Commerce Department had no legal basis for halting such sales as those involved in the Saad 16 complex until the regime went into effect in 1987.

The officials said they were unaware of any U.S. sales to the Iraqi complex since April 1987.

Carus said that in addition to MBB, West German and Austrian news reports had identified a German-Austrian company, Gildemeister, as the principal builder of the Saad 16 complex. He said the reports named two U.S. firms besides Hewlett-Packard and Wiltron which allegedly provided equipment to it.

The two others were Tektronix Inc. of Beaverton, Ore., a manufacturer of computer graphics terminals and measuring instruments, and Scientific-Atlanta Inc. of Atlanta, which makes telecommunications and satellite ground station equipment.

A spokesman for Tektronix said yesterday the firm was searching records for sales to Iraq or the Gildemeister firm. A person at Scientific-Atlanta said offices were closed for the day.

Carus testified that "a variety" of West German firms were involved in building the Saad 16 complex, in which Iraq had invested more than $200 million. He described it as a research and development facility to build "a variety of different types of missiles, including both ballistic and cruise missiles."

But U.S. officials said they thought the complex would also be involved in the pro-

duction of various weapons, including missiles.

The West German magazine Stern said Hewlett-Packard had provided computers for more than 50 laboratories in the complex.

[From the London Financial Times, 12 Apr. 1989]

PROSECUTOR LAUNCHES INQUIRY INTO MBB'S CONDOR MISSILE LINKS

(By Simon Henderson and David Goodhart in Bonn)

The Munich city prosecutor is investigating reports that a subsidiary of the West German aerospace concern Messerschmitt-Bolkow-Blohm (MBB) broke export control laws by delivering parts for a DM70m missile system to Iraq.

MBB would make no comment on the allegations but did confirm yesterday that its subsidiary MBB-Transtechnica was being investigated.

Western officials say that a group of 16 companies in Europe, known as the Consen Group, is using West German rocket designers and other specialist to help Egypt, Argentina and Iraq develop a 1,000km-range missile capable of carrying nuclear and chemical warheads. The companies are registered in Monaco, Switzerland, Austria, West Germany, and Argentina.

MBB is one of six big European companies named in documents as being "most important in co-operation and as sub-contractors".

Western officials expressed concern at the activities of the Consen Group, which they say is acting as a "European missile management company", buying in expertise for the missile, the Condor II, particularly on propellants and guidance systems, using predominantly West German engineers.

One Consen company, the IFAT Corporation of Zug, Switzerland, was quoted last year in US court documents as sending more than $1m to an Egyptian-born American citizen now awaiting trial in California charged with conspiring to export missile parts to Egypt without a license.

Another company in the group, Desintec, also of Zug, attempted to buy missile nozzles from the US in 1984 for the Argentine Air Force.

Western officials describe the Condor II as a two-stage, solid fuel rocket. They say that it was due to be tested in Argentina in October but was delayed by technical problems. Development is being conducted in parallel in both Egypt and Argentina, with Iraq funding part of the Egyptian programme. Deployment is not expected until 1992.

Washington and London are leading a diplomatic effort to stop the development of the missile. In 1987 they agreed with other Western European nations and Japan on a Missile Technology Control Regime which tightened export controls on sensitive items. The UK is worried that the Condor II will have the range and accuracy to hit the airfield on the Falklands from Argentina. The main US concern is the impact in the Middle East.

Israel, which has already test-fired its own long-range missile, the Jericho II, is developing its own anti-missile missile. Western intelligence officials credit the Israeli secret service, Mossad, with causing three explosions in Europe seeking to break up the Consen operation, including one last May when the car of Consen's general manager was blown up on the French Riviera.

MBB has admitted helping Argentina develop an earlier missile, Condor I, but says it is not involved in Condor II. But its subsidiary MBB Transtechnica is a sub-contractor to another West German company, Gildemeister, on a project in Iraq known as Saad 16. Last week West German investigators seized files from Gildemeister.

[From Mid East Markets (MEM), Apr. 17, 1989]

CONDOR II: AN ISSUE TO TEST US-EGYPT TIES

A reference to a new missile in MEM on February 6 1989 set off a whole series of articles elsewhere and brought into the open a simmering diplomatic row. MEM understands that when President Mubarak was in Washington he was asked about Egypt's intentions concerning the missile which it is building with Argentina's technical help and Iraqi finance. The Israeli Prime Minister, Yitzak Shamir, also asked the US what was going on, and last week the Israeli Foreign Minister, Moshe Arens, asked the West German Defence Minister, Rupert Scholz, about the involvement of West German companies.

Although still to be flight-tested the Condor II missile is state-of-the-art. It has two solid-fuel stages and will fly a 700kg payload over 1000km. It is likely to have terminal guidance to make it accurate to within 100m. Existing missiles in Arab arsenals are antiquated by comparison and hardly accurate enough to hit even a city. The Soviet-supplied Scud is a version of the Nazi V-2 missile from World War Two. It has a single-stage liquid-fuelled motor which means that the missile must be accompanied by tankers containing highly volatile fuel to top up the missile.

The new Iraqi missiles—Al Hussein (range 650km) and Al-Abbas (range 860km)—are merely enhanced Scuds with a longer range obtained by using less warhead and more fuel. The Saudi missiles obtained from China are also liquid-fuelled and probably unserviceable most of the time: imagine storing and handling the fuming nitric acid and industrial alcohol fuels in desert temperatures of over 40°C!

CONSEN

Argentina and Egypt agreed to cooperate on Condor II in the early 1980s, with Iraq helping Egypt under a secret exchange agreement believed to be known as Badr 2000. All three countries have been helped by a mysterious collection of European companies known as the Consen Group. One Consen company, the Ifat Corporation, financed an attempt to buy missile technology last year in the US for which an Egyptian-born US citizen is awaiting trial. The man, Abdel Kader Helmy, is described by his lawyer as being a childhood friend of the Egytian Defence Minister, Abdel Halim Abu Ghazala, who is also implicated in the attempt to break US export laws.

Another Consen company, Desintec, tried to buy rocket nozzles for the Condor II from a California company in 1984. They were to be sent to the Argentine air force. Plans for the nozzles are shown here, including a cross-section of the missile with its internal star shape to ensure best burning of the propellant. (Consen declined to comment on its involvement with Condor II.) (Graphs not reproducible.)

The Consen Group has used West German rocket engineers and other specialists to help Egypt and Argentina, and may also have helped Iraq in its Scud enhancement programme, which tilted the balance in the Gulf war when the modified missiles started to rain down on Tehran last year.

The Egyptian missile production facilities are being readied at Military Factory 90 in the Abu Zabaal area outside Cairo. This is also where reports claim that Egypt has a chemical weapons plant, and where Field Marshal Abu Ghazala wants to build a production line for the US Abrams tank.

Iraq's Scud modification plant is thought to be at the Sa'ad 16 complex near Mosul, although there is another programme, designated Project 395, which is considered more closely linked to the Condor II. There have been direct contacts between the Iraqi Technical Corps for Special Projects (Teco), the organisation responsible for Project 395, and the Argentine Institute of Aeronautical and Space Research, which co-ordinates work on the Condor. Teco, which also drafts experts into oilfield work and other non-military areas, comes under the direct authority of President Saddam Hussein, although it is run by his son-in-law, the Minister for Industry and Military Industrialisation, Brig. Hussein Kamel Majid.

During recent weeks West German officials have started investigating the activities of a subsidiary of the aerospace giant, Messerschmitt-Bolkow-Blohm (MBB) which is involved with another West German company, Gildermeister Projecta, at Sa'ad 16 in Iraq. Yet other West German companies are linked to Military Factory 90 in Egypt.

SUBSTANCE TO NUCLEAR ALLEGATIONS AGAINST IRAQ

Although the US Government was annoyed when Israeli officials leaked reports that Iraq was trying to develop a nuclear weapon, the denials of the more knowledgeable officials were more qualified than much of the press noticed.

The assertion of the Washington Post was that Israeli officials thought that Iraq was between two and five years from making an atomic bomb. The newspaper also claimed that the device was intended to put on the Condor II missile being developed in conjunction with Egypt and Argentina (see separate story).

The more conventional estimate for Iraq achieving membership of the nuclear club is 10 years. Nuclear status might have been reached eight years ago, but the destruction caused by an Israeli bombing raid on the Tuwaitha nuclear centre in 1981 was so total that the possibility of using a research reactor to produce plutonium had to be abandoned.

Present concern about Iraq is based on increasing efforts that the country is trying to build a uranium enrichment plant using the centrifuge principle. Highly enriched uranium is an alternative weapon material to plutonium, but can only be produced using an elaborate and sophisticated industrial plant. Western officials have noted over the years the number of Iraqi students being sent abroad to study the two basic principles of uranium enrichment diffusion and centrifuges. Recently, they say, it became clear that Iraq had opted for the centrifuge route in which uranium, in a gaseous form, is pumped through hundreds of linked high-speed centrifuges.

USA officials confirm that $400,000 worth of vacuum pumps destined for Iraq, and suspected to be destined for a nuclear plant, were recently stopped from being shipped. What had caught the attention of US agents was that the pumps in question were designed for use with vegetable oil but were being ordered by the State Company for Oil Projects, Iraq's main oil equipment purchase body. When asked to explain the order by the US, Iraqi officials were not able to give an adequate answer.

There are very few centrifuge plants in the world, and most produce low enriched uranium for power stations. The only one in the developing world is in Pakistan which, despite denials, has been producing enough highly enriched uranium to make between four and six bombs a year for the last two years. The Pakistan plant uses techniques

similar to those developed by the Urenco consortium of the UK, the Netherlands and West Germany to produce uranium for their power stations.

Pakistan took 10 years to build and start operating its plant, overcoming foreign export controls and technical difficulties, hence the time frame for Iraq. The difference, western officials say, is that Iraq is putting considerably more money and effort into its buying programme. Maybe the Israelis were right after all.

SAUDI CONCERN OVER CHEMICAL CLAIM

The Saudi Government is showing its usual sensitivity: this time on the delicate subject of chemical weapons. A fairly innocuous reference in a long series on the subject in the Chicago Tribune elicited from Saudi officials a denial that was considerably longer than the original claim.

The Chicago Tribune on April 4 listed 25 countries it said were known or suspected by US intelligence officials to possess or be developing chemical weapons. The Middle East countries included were Israel, Egypt, Libya, Syria, Iran and Iraq. The Tribune then added: "Suspected of being in the next echelon of those who have an interest in an possible access to resources needed to build chemical weapons are Saudi Arabia, Pakistan, India, Thailand, Brazil, Argentina, Chile and Peru, according to these sources."

This was the sole reference to Saudi Arabia in a cluster of articles and background pieces on chemical warfare published by the Tribune and totalling more than 10,000 words. But it was enough to prompt a statement from the official Saudi Press Agency that the kingdom had issued a categorical denial of the report's allegation that it was a country with the potential to produce chemical weapons.

"A responsible Saudi source told the Saudi Press Agency here today that what had been published by the Chicago Tribune is merely baseless and fabricated," the agency said in a report issued on April 6. The kingdom had declared, and again reiterated, its opposition to the production of chemical weapons. The agency's report then drew attention to the kingdom's recent ratification of the Nuclear Non-Proliferation Treaty.

This was the important point, because the denial was as much aimed at scotching reports in the US press that Riyadh had agreed to help Iraq underwrite the financial costs of refurbishing its Osirak nuclear facilities at Tuwaitha outside Baghdad—bombed by Israel in 1981—as at replying to vague assertions that the kingdom possessed some potential for chemical weapons manufacture.

The episode is also instructive because it underscores the strong sensitivity of the Saudis on the delicate issue of unorthodox weapons of any kind. Having received their medium-range East Wind missiles from China, the Saudis are taking pains to make it clear to the US that there is no question of them being equipped with anything other than conventional warheads.

UNDERSTANDING WITH ISRAEL

For more than a year the US has been engaged in discreet but parallel talks with the Saudis and the Israelis aimed at preventing either a pre-emptive strike—presumably by Israel—or any wedding of chemical weaponry to existing missiles—presumably with regard to the Saudis. (Western intelligence officials say that the Chinese missiles delivered to the kingdom have had their range reduced to between 1200-1400 km. In Chinese service the missile carried a nuclear warhead; indeed it was the missile used to test China's fourth nuclear bomb, the design of which was subsequently passed on to the Pakistanis, the officials say.)

For the Saudis, much is at stake. The kingdom is currently seeking assurances from the Bush Administration that the US will agree to a major sale of some 315 General Dynamics Land Systems Divison M1-A1 main battle tanks, together with between 50 and 100 replacement aircraft for its aging fleet of 110 F-5 reconnaissance aircraft and interceptors. The Saudis are also seeking to secure the tracked Multiple Launch Rocket systems (MLRS) battlefield rocket and 2,000 of the Mark-84 aerial bombs. US companies concerned with the potential sales are engaged in a major campaign to inform Congress of the importance of these arms deals. They are basing their case not so much on Saudi Arabia's defence needs, but on the economic costs to the US if these deals, which are potentially worth several billion dollars, fail to go through.

ADMINISTRATION'S VIEW

The Bush Administration—and in particular the new Director of Policy Planning at the State Department, Dennis Ross—remains particularly concerned about the growing political acceptability of chemical weapons in the Middle East following Iraq's successful use of chemical weapons in both its campaigns against Iran and in its repression of Iraqi Kurds. The Saudis therefore need to counter this impression if they are to secure the weapons systems they favour.

US defence industry officials have told MEM that the Saudis are again looking to the US for military aircraft, because it is complicated enough having to introduce one totally unfamiliar aircraft into their inventory—the British Aerospace Tornado—and they would feel comfortable if the replacement for their F-5s were to come from the US.

Ideally, they would like a further 50 McDonnell Douglas F-15 interceptors, which could then be incorporated into the Saudi arsenal with relative ease as the Royal Saudi Air Force already possesses 60 F-15s. Failing that, they would choose to replace their 110 F-5s on a one-for-one basis with General Dynamics F-16s or McDonnell Douglas F/A-18s.

[From the New York Times, Feb. 23, 1989]

THOSE CHINESE MISSILES

(By William Safire)

WASHINGTON.—If you keep tugging on a loose thread, the Hong Kong tailors warn, your whole suit could fall apart.

Here's a loose thread: In Chicago, consular representatives of the People's Republic of China are now forbidden to travel in their consular cars outside the environs of Cool County. Public transportation, yes; private cars, no.

Tug gently on that stray fact. Why can't these Chinese diplomats travel in their own vehicles to catch whatever is playing in Peoria? What are we afraid they may see?

Nothing. It' part of a proper tit-for-tat policy, begun last Oct. 24, reciprocating for a seemingly weird policy of the Chinese Government. For some reason, American diplomats in Shenyang, a large city between Beijing and the border of North Korea, are forbidden to drive unaccompanied to see what's happening along the border.

Tug again. What might our officials in China want to eyeball, and perhaps photograph or ask questions about, along that road that has the Chinese so sensitive? We know from our satellites that no top-secret military or research installaiton is hidden there.

The road we cannot travel unaccompanied runs from Beijing alongside the railroad line to Dandong, on the Yalu River. That is where the train crosses into North Korea, delivering missile-length boxes first to Sinuiju and later to the port of Nampo.

Keep tugging. These are the ports from which North Korea exports missiles and missile-support electronics to Iran, Libya and Syria. Some American officials, whose suspicions are pooh-poohed in our State Department, believe that these IRBM's are built in China, sent by rail to North Korea and transshipped to the Middle East terrorist nations.

A company of great interest to international missile-watchers is Poly-technology, which is affiliated with Citic, the Chinese trading-banking-industrial development combine. Polytech is said to be staffed by the sons and daughters of China's leading political families, whose prestigious rice bowls will be hard to break.

The P.R.C. officially denies selling Silkworm missiles to Iran, or any missiles to Libya, Iraq or Syria that might be used to deliver locally produced poison-gas warheads. The Chinese do not deny—indeed, proudly assert—a deal made last year to supply Saudi Arabia with its CSS-2 East Wind missiles, with a range up to 2,000 miles.

That Chinese-Saudi missile deal stunned Washington, which mistakenly thought that neither Beijing nor Riyadh would alter the balance of power in the Middle East without at least checking with the U.S.

Frank Carlucci, then Secretary of Defense, was dispatched to the Chinese capital last September to seek assurances that no missilery would be sold to the Terrorist Club.

Now here is where at least some of the suit falls apart, Secretary Carlucci, operating without Presidential supervision or senatorial oversight, may have thought he had assurances from the Chinese to stop the dangerous spread of missiles, in return for secret promises to more U.S. technical aid. He passed the word around pre-election Washington: Not to worry.

But the Chinese are proud to compete with superpowers on rocketry, and are the subtlest negotiators. They may be keeping their word, if such was given, not to export missiles to the Middle East—but that would not include weaponry to North Korea, which may be falsely promising not to transship from Nampo. Equally important, the Chinese leadership may believe it is free to sell the equipment and knowhow to any nation seeking to make missle systems on its own soil.

The embarrasing question President Bush will hate to ask, when he visits China this weekend, is this: Is a Chinese company on the verge of a deal to supply Colonel Qadhafi, or anyone, with the technical package needed not only to produce but to launch and guide missiles?

Mr. Bush should not put his personal inclination to be a polite visitor above America's national interest. He can hope, with delicacy but with firmness, that Chinese missile support systems—using such hot stuff as cable digital communications, pulse width modulation or microcomputer technology—are not for sale to dictators endangering world peace.

Deng Xiaoping will catch his drift: without a credible and reportable agreement to restrict missile delivery systems, China can expect no further U.S. technological cooperation.

With that understood, the two leaders can clink glasses, reminisce, pose in front of the Great Wall and otherwise pre-empt the visit of Mr. Gorbachev.

U.S. Probe IAEA About Safeguards for North Korean Nuclear Plants

(By Ann MacLachlan)

The U.S. complained to the February meeting of the IAEA Board of Governors about North Korea's delay in submitting its nuclear facilities to agency safeguards. The Peoples Democratic Republic of Korea (PDRK) signed and ratified the Nuclear Nonproliferation Treaty (NPT) several years ago in anticipation of a nuclear plant deal with the USSR (Nucleonics Week, 2 Jan. '86, 7) However since that action, the Asian nation has neither consummated the purchase of Soviet PWRs nor concluded the required safeguards agreements with the IAEA.

The U.S. and even more so the Republic of Korea which is still technically at war with the PDRK, are doubly concerned because satellite photographs have shown that North Korea is operating a magnox reactor. North Korea, which does not maintain diplomatic relations with the U.S., is also believed to be building a reprocessing plant near the magnox reactor.

A senior IAEA official said that following the U.S. complaint, the North Koreans were "reminded" of their obligation under the NPT to conclude a general safeguards agreement and facility attachments covering any nuclear installations containing material that comes under * * * safeguards. The U.S., said a well-informed source, has said it will take its real complaint about the two clandestine facilities formally to the IAEA board, satellite photos included, if the North Koreans continue to foot-drag in concluding the safeguard agreement.

The satellite photos show, the source said, that Pyongyang has set up a virtual replica of the 60-MW Calder Hall magnox reactor, Britain's first, which started up in 1956. The North Koreans, he said, appear to have built a reactor themselves based on the declassified design of Calder Hall. They also may have purified indigenously the graphite used as moderator block, but the uranium is assumed to be imported, the source said. The reactor started operating a year and a half ago, he said.

The reprocessing plant is observed to be under construction across a river in central North Korea.

Not surprisingly, the facilities have caused consternation across the border in South Korea, which tried to buy a reprocessing plant 10 years ago from France but was stymied by stiffening of French nonproliferation policy.

The Calder Hall reactor is still operating at British Nuclear Fuel's Windscale works, producing electricity and materials for the U.K. nuclear defense program.●

THE GLOBAL SPREAD OF BALLISTIC MISSILES -- 1989

MIDDLE EAST and AFRICA

Country	*Missile*	*Producer*	*Status*
Egypt	Scud-B Badr-2000 (Condor II)	USSR Egypt/Argentina	in service under development
Iran	Scud-B Unnamed	USSR/N. Korea Iran/China	in service uncertain
Iraq	Scud-B Scud-B (Al Husayn) Scud-B (Al Abbas) SS-12 Condor II	USSR Iraq-modified Iraq-modified USSR Argentina/Egypt with Iraq funding	in service in service in service in service under development
Syria	Scud-B	USSR	in service
Libya	Scud-B	USSR	in service
Saudi Arabia	CSS-2	China	in service
Israel	Jericho Jericho II	Israel Israel	in service possibly in service
South Yemen	Scud-B	USSR	in service
Afghanistan	Scud-B	USSR	in service

ASIA

Country	*Missile*	*Producer*	*Status*
India	Prithvi Agni	India India	under development under development
Pakistan	HATF-2	Pakistan w/China	under development
Taiwan	Sky Horse	Taiwan	under development
North Korea	Scud-B	N. Korea/Egypt	in service
South Korea	NHK (mod.)	S. Korea	in service

SOUTH AMERICA

Country	*Missile*	*Producer*	*Status*
Argentina	Condor II	Egypt/Iraq/Argentina	under development
Brazil	MB/EE series SS series	Brazil Brazil	under development under development

The Spread of Nuclear Weapons
1989
BRITAIN
FRANCE
UNITED STATES
SOVIET UNION
ISRAEL
IRAQ
IRAN
LIBYA
INDIA
PAKISTAN
CHINA
NORTH KOREA
SOUTH KOREA
TAIWAN
BRAZIL
ARGENTINA
SOUTH AFRICA
Declared nuclear weapon nations
De facto nuclear weapon nations. These countries are thought able to deploy one or more nuclear weapons within months or to have already deployed them.
Countries to monitor. These countries have taken steps since 1960 to develop nuclear weapon capabilities or to acquire nuclear weapons – or appear strongly motivated to do so.
Countries of past concern. These countries took steps to develop nuclear weapon capabilities during the 1970's, but have terminated these activities.
Abstaining countries. These countries have the technological base, but not the intent, to develop nuclear weapons. A number have installations under international inspection that can produce nuclear weapon material.
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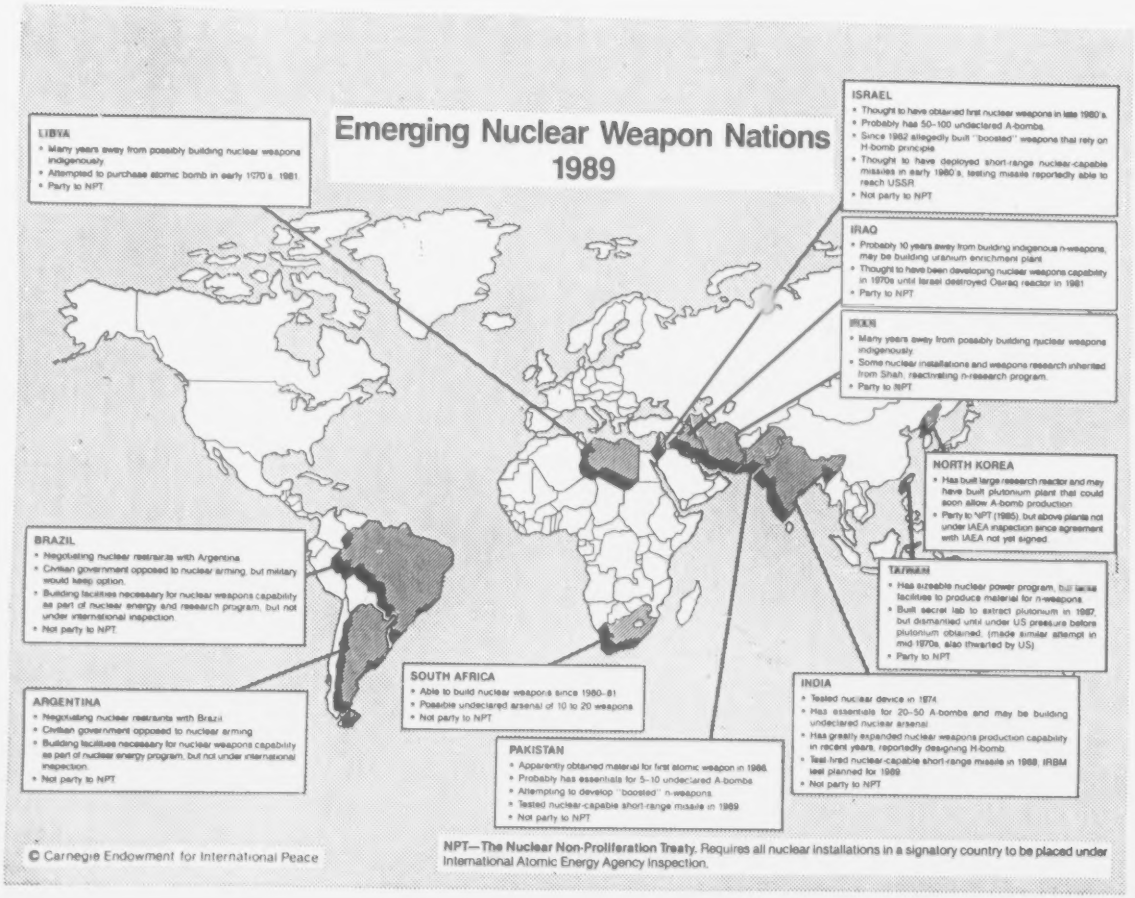
Emerging Nuclear Weapon Nations
1989
LIBYA
• Many years away from possibly building nuclear weapons indigenously.
• Attempted to purchase atomic bomb in early 1970's, 1981.
• Party to NPT.
ISRAEL
• Thought to have obtained first nuclear weapons in late 1980's.
• Probably has 50–100 undeclared A-bombs.
• Since 1982 allegedly built "boosted" weapons that rely on H-bomb principle.
• Thought to have deployed short-range nuclear-capable missiles in early 1980's, testing missile reportedly able to reach USSR.
• Not party to NPT.
IRAQ
• Probably 10 years away from building indigenous n-weapons, may be building uranium enrichment plant.
• Thought to have been developing nuclear weapons capability in 1970s until Israel destroyed Osiraq reactor in 1981.
• Party to NPT.
IRAN
• Many years away from possibly building nuclear weapons indigenously.
• Some nuclear installations and weapons research inherited from Shah, reactivating n-research program.
• Party to NPT.
NORTH KOREA
• Has built large research reactor and may have built plutonium plant that could soon allow A-bomb production.
• Party to NPT (1985), but above plants not under IAEA inspection since agreement with IAEA not yet signed.
TAIWAN
• Has sizeable nuclear power program, but lacks facilities to produce material for n-weapons.
• Built secret lab to extract plutonium in 1987, but dismantled until under US pressure before plutonium obtained. (made similar attempt in mid-1970s, also thwarted by US).
• Party to NPT.
BRAZIL
• Negotiating nuclear restraints with Argentina.
• Civilian government opposed to nuclear arming, but military would keep option.
• Building facilities necessary for nuclear weapons capability as part of nuclear energy and research program, but not under international inspection.
• Not party to NPT.
SOUTH AFRICA
• Able to build nuclear weapons since 1980–81.
• Possible undeclared arsenal of 10 to 20 weapons.
• Not party to NPT.
INDIA
• Tested nuclear device in 1974.
• Has essentials for 20–50 A-bombs and may be building undeclared nuclear arsenal.
• Has greatly expanded nuclear weapons production capability in recent years, reportedly designing H-bomb.
• Test-fired nuclear-capable short-range missile in 1988, IRBM test planned for 1989.
• Not party to NPT.
ARGENTINA
• Negotiating nuclear restraints with Brazil.
• Civilian government opposed to nuclear arming.
• Building facilities necessary for nuclear weapons capability as part of nuclear energy program, but not under international inspection.
• Not party to NPT.
PAKISTAN
• Apparently obtained material for first atomic weapon in 1986.
• Probably has essentials for 5–10 undeclared A-bombs.
• Attempting to develop "boosted" n-weapons.
• Tested nuclear-capable short-range missile in 1989.
• Not party to NPT.
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NPT—The Nuclear Non-Proliferation Treaty. Requires all nuclear installations in a signatory country to be placed under International Atomic Energy Agency inspection.